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# TERMINAL FORECAST REFERENCE FILE

OFFUTT AFB



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## 13. ABSTRACT

This publication discusses the location and topography, climatology, and weather regimes affecting Offutt AFB. It also provides a section for forecast studies to objectively aid one in forecasting for Offutt AFB.

Details of illustrations in  
this document may be better  
studied on microfiche

167  
98

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Climatology						
Forecast Studies						
Precipitation Type						
Offutt Air Force Base						

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TERMINAL FORECAST REFERENCE FILE

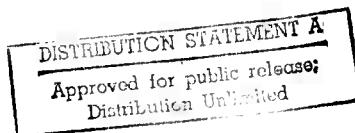
PART I

LOCATION AND TOPOGRAPHY

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SECTION B      TOPOGRAPHY	I-B-1
SECTION C      POLLUTANTS	I-C-1
SECTION D      INSTRUMENTATION	I-D-1
SECTION E      OBSERVING LIMITATION	I-E-1

Details of illustrations in  
this document may be better  
studied on microfiche

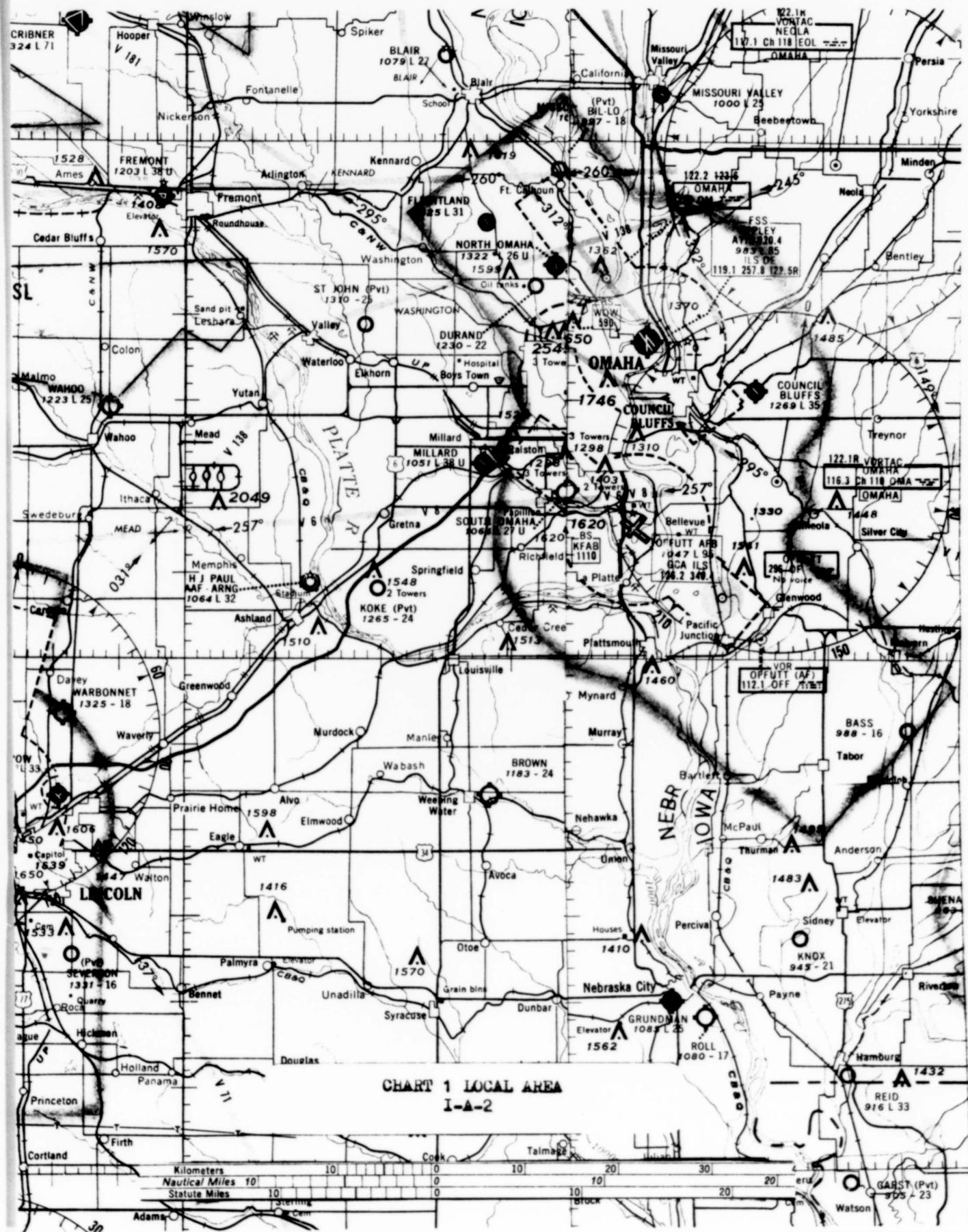
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#### SECTION A LOCATION

Offutt AFB is located in east central Nebraska at geographical coordinates  $41^{\circ} 07' N$  and  $95^{\circ} 55' W$  and is on Central Standard Time (GMT-6). The runway direction is northwest ( $300^{\circ}$ ) southeast ( $120^{\circ}$ ) and is situated approximately one and one-half miles west of the Missouri River and three miles north of the Platte River. The two rivers join about four miles south of the southeast end of the runway.

Omaha, population 390,000, lies ten miles north and the city of Bellevue, population 25,000, adjoins the base to the northeast. See Chart 1 (Local Area).



## SECTION B TOPOGRAPHY

The base is located on relatively low land between the Missouri River and the Papillion Creek. The runway slopes up from 970 feet southeast to 1050 feet northwest where it is higher than the immediate terrain.

The Missouri River Valley slopes up generally from the southeast to northwest with elevations at St Joseph, Mo of 825 feet; Omaha, Neb 950 feet; Sioux City, Ia 1080 feet; and Huron, SD 1250 feet. There is a ridge between Huron and Minneapolis, Minn with maximum heights to 1800 feet which lowers to 1600 feet between Omaha and Des Moines and to 1000 feet in the Lamoni, Ia - Kansas City, Mo area. To the west the terrain starts to rise just west of the Platte River reaching an elevation of 1800 feet 80 miles west of Offutt. A ridge runs southeastward from just south of North Platte, Neb towards Kansas City with elevations to 1800 feet southwest of Offutt.

As the topographic map shows,  $120^{\circ}$ - $160^{\circ}$  is upslope while winds from  $330^{\circ}$ - $360^{\circ}$  are neutral or slightly downslope. Winds from  $160^{\circ}$ - $330^{\circ}$  and  $360^{\circ}$ - $120^{\circ}$  are downslope.



**CHART 2 TOPOGRAPHY**  
**I-B-2**

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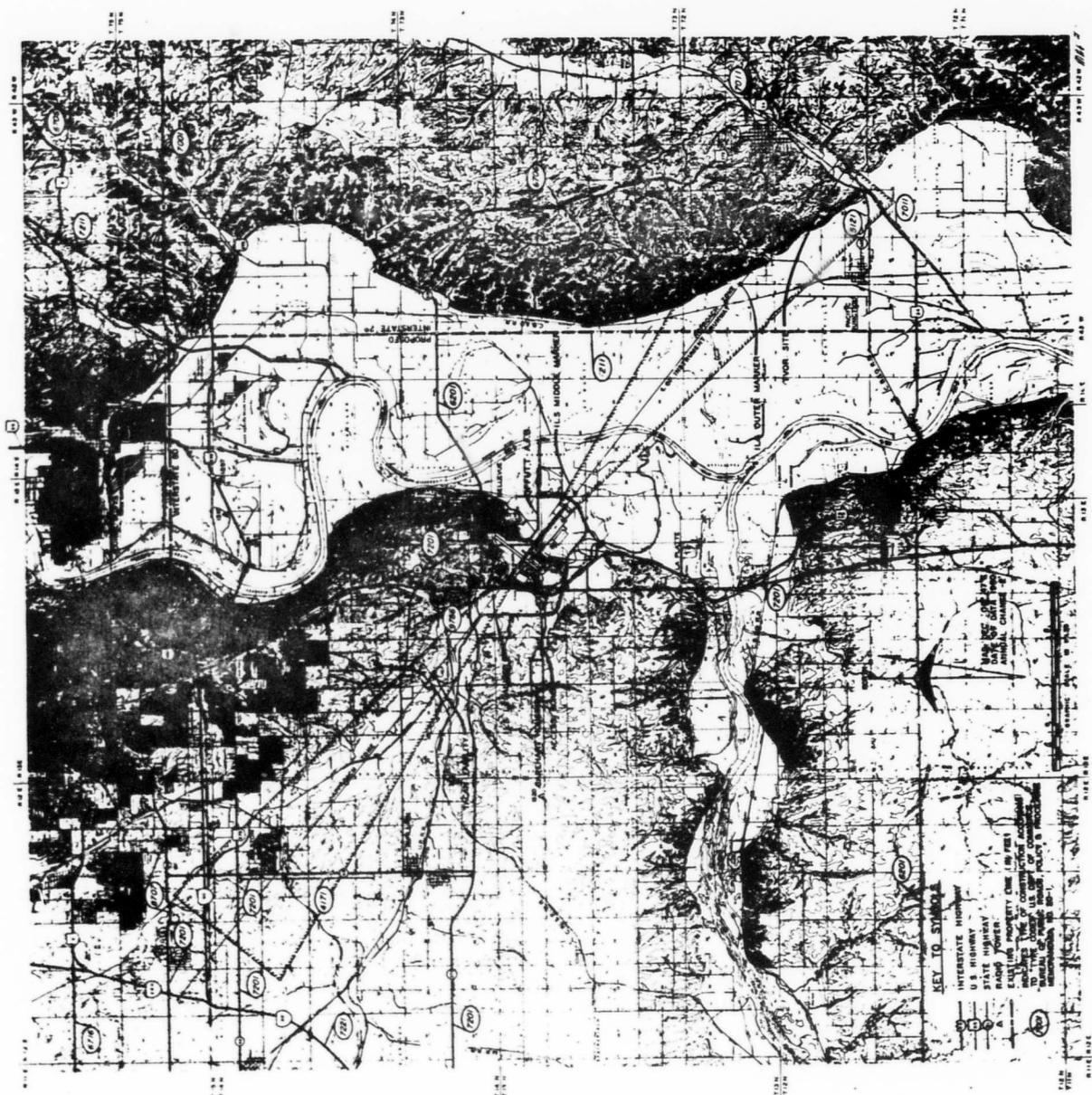


CHART 3 TERRAIN PHOTOGRAPH  
I-B-3

### SECTION C POLLUTANTS

Pollution by smoke is at times a contributing factor to reduced visibility but rarely the major cause of visibility below three miles. Omaha is the major source of smoke over the general area. Locally, the Allied Chemical Plant located one mile south of Offutt is the major source (See Chart 4). The OPPD power plant which is one mile northeast of the base is another source but usually involves relatively high level smoke or contributes to the formation of river fog. The Allied Chemical Plant contributes to the fog intensity with weak southerly or southwesterly flow. On one rare occasion, smoke reduced the visibility to less than one half mile. This was over a snow cover with a strong surface inversion, surface temperature near zero, and calm surface winds. Smoke collected in the low areas after sunset and reduced the visibility to 1/16 mile between 2300 and 0100 LST. By 0200 LST the visibility was above one mile and no further decrease in visibility was noted.



SECTION D INSTRUMENTATION

TYPE	SENSOR	READOUT	REMARKS
WIND	QMQ11 Dual	Ob Site Base Wea Control Twr GCA RAPCON	Sensor at SW end in slight hollow. Sensor at NW end partly sheltered by buildings
CLOUD HEIGHT	GMQ13 Dual	Ob Site	Max height 3900'
VISIBILITY	GMQ10 Dual	Ob Site	FMN1 RVR
TEMPERATURE HUMIDITY	TMQ11	Ob Site	
PRESSURE	ML512 ML102 ML563	Ob Site	
Precipitation	ML17	Ob Site	
STORM RADAR	FPS77	Base Wea	
RADAR CLOUD DETECTION	TPQ11	Base Wea	

NOT REPRODUCIBLE

MAG. DEC. 08° 47' E  
DATE OF DATA 1960  
ANNUAL CHANGE -2'

0 800 1600 2400 3200  
GRAPHIC SCALE IN FEET

NOT REPRODUCIBLE

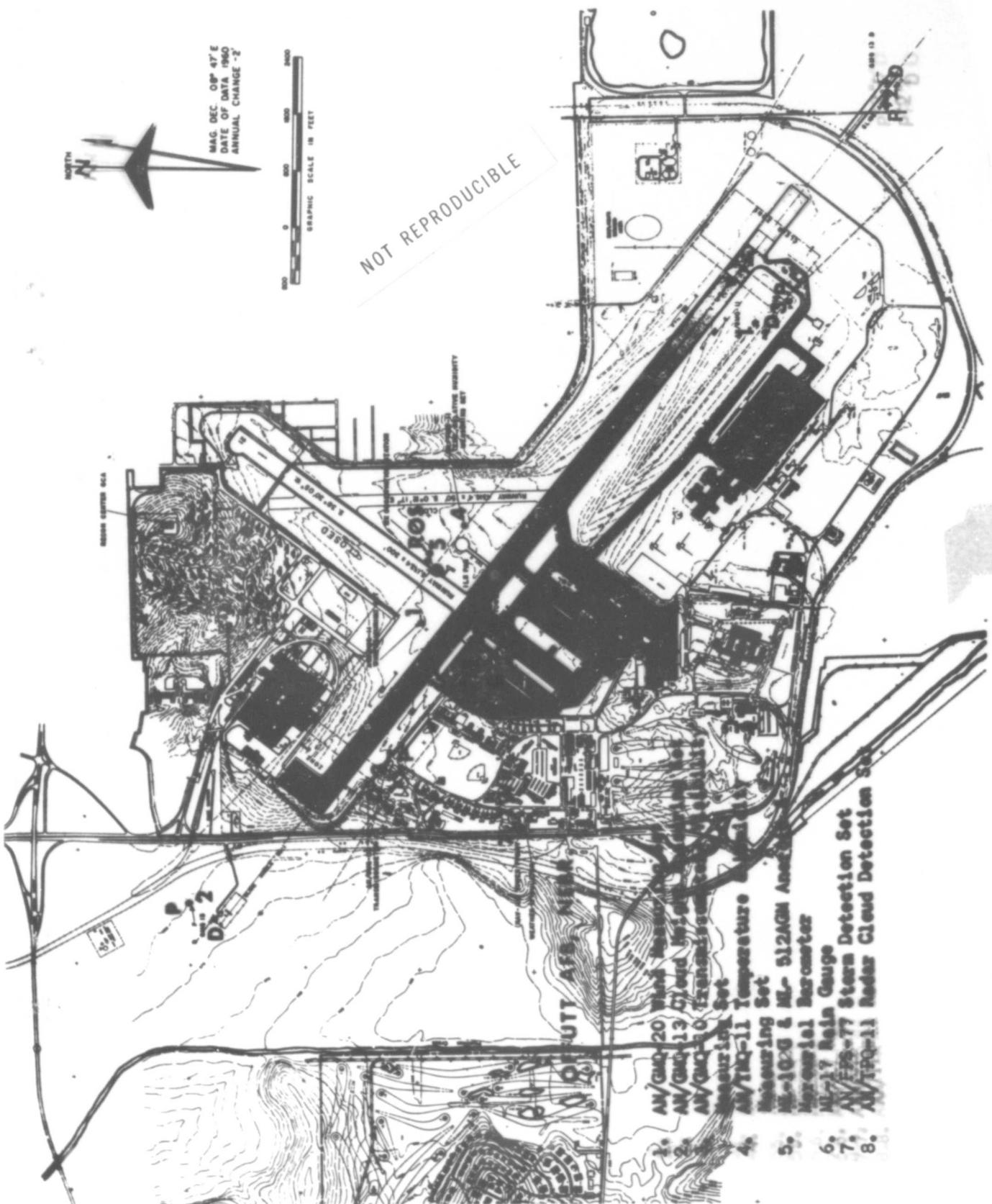
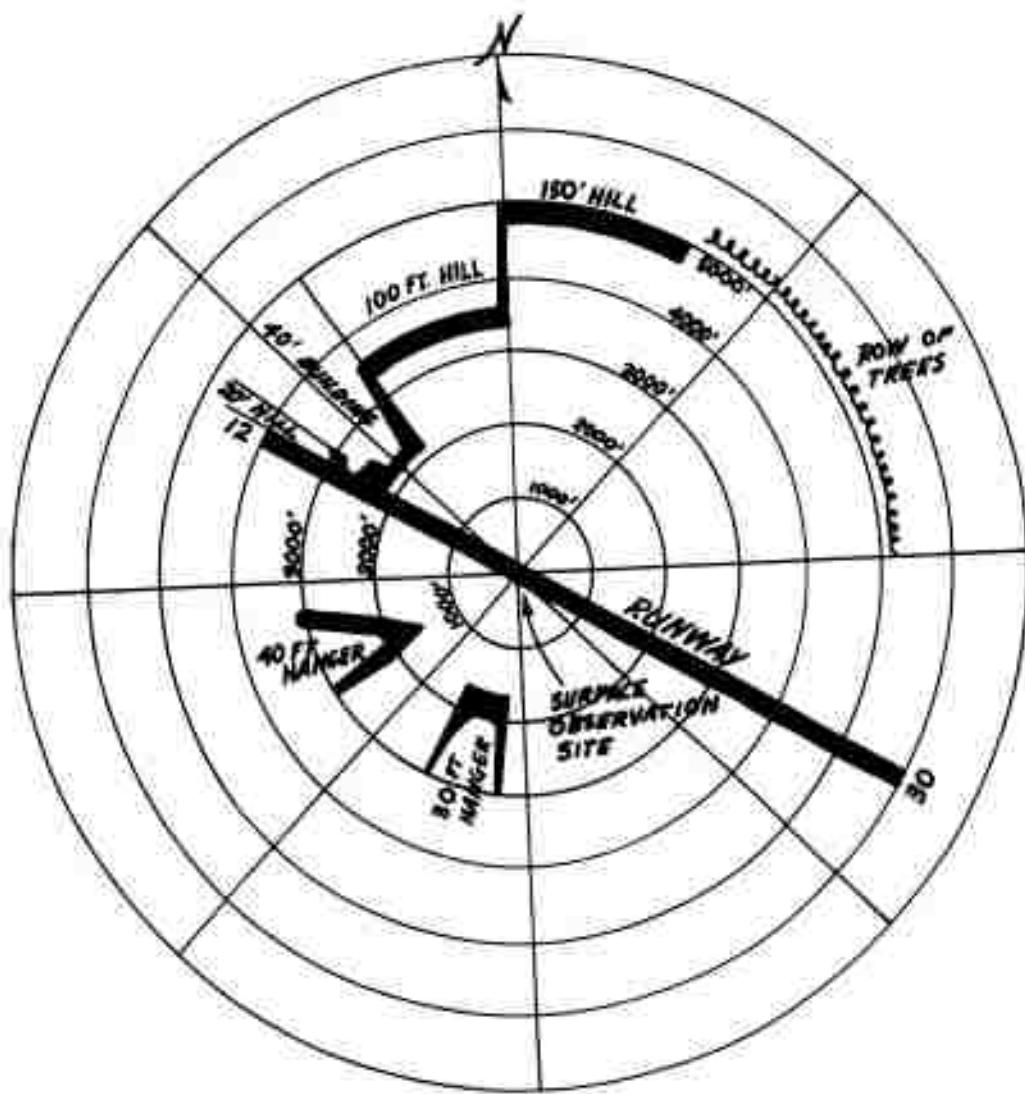


CHART 5 INSTRUMENTATION  
1-D-2

#### SECTION E OBSERVING LIMITATION

The representative observation site is located near the center of the runway in a slight hollow. The building is constructed three feet off the ground such that a standing observer has his eye level at about nine feet. Local terrain and construction limits his field of view in several sectors and limits his visibility check points. (See Chart 6)



HORIZON VISIBILITY OBSTRUCTIONS  
FROM  
SURFACE OBSERVATION SITE

CHART 6 OBSERVING LIMITATIONS  
1-E-2

TERMINAL FORECAST REFERENCE FILE

PART II

CLIMATOLOGY

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## SECTION A REFERENCES

The following list of references is provided to indicate what is immediately available in the way of climatic aids in the weather station. Most of the information is too bulky to reproduce in this paper and summarization is not meaningful. A brief review of all listed aids by each forecaster is suggested for overall understanding of their content.

### 1. DIURNAL HEATING CURVES

Location: Top shelf of forecasters cabinet  
Description: Hourly heating and cooling by ceiling, wind direction, and wind speed

### 2. WIND STRATIFIED PERSISTENCE PROBABILITY

Location: Top shelf of forecasters cabinet  
Description: Ceiling-visibility persistence probability by month, initial time, and wind direction

### 3. WIND PERSISTENCE PROBABILITY

Location: Top shelf of forecasters cabinet  
Description: 3-6-12-24 hour persistence probability for TAF times by categories of wind speed and direction

### 4. CEILING-VISIBILITY CATEGORY FREQUENCY

Location: Top shelf of forecasters cabinet  
Description: Percent frequency of observed ceiling-visibility categories by hour and wind direction

### 5. DETERIORATION PERSISTENCE PROBABILITY

Location: Top shelf of forecasters cabinet  
Description: 1 through 24 hour probability of a lower final category

### 6. ONSET-DURATION TABLES

Location: Top shelf of forecasters cabinet  
Description: Ceiling-visibility category duration by month and onset time

### 7. UNIFORM SUMMARY OF RAWLSONDE OBSERVATIONS

Location: Top drawer of forecasters files  
Description: contains winds aloft data, height summary, temperature-humidity summary

8. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS  
Location: Top drawer of forecasters files  
Description: Contains frequency data for weather phenomena including category data for surface winds, ceilings and visibility
9. RELATED CEILING-VISIBILITY OBSERVATIONS FOR OFFUTT, LINCOLN, AND LITTLE ROCK  
Location: Surface records storage cabinet  
Description: Relates above parameters by month and hour
10. OFFUTT PRESSURE OBSERVATIONS  
Location: Surface records storage cabinet  
Description: Statistics relating to pressure altitude, station pressure, and sea level pressure by month and hour
11. OFFUTT DEGREE DAYS  
Location: Surface records storage cabinet  
Description: Data based on 65°F threshold by month
12. JANUARY WIND CHILL  
Location: Surface records storage cabinet  
Description: Category probability by hour
13. 24 HOUR PRECIPITATION AMOUNTS  
Location: Surface records storage cabinet  
Description: Frequency distributions for categories by year and month
14. FREQUENCY DISTRIBUTION OF PEAK GUSTS  
Location: Surface records storage cabinet  
Description: Determined for specific categories by year and month
15. DAILY MAX-MIN TEMPERATURE FREQUENCIES  
Location: Surface records storage cabinet  
Description: Occurrence for max (Jun-Sep) and min (Dec-Feb) by year
16. 1200Z SNOW DEPTH  
Location: Surface records storage cabinet  
Description: Occurrence by year and month
17. 24 HOUR SNOWFALL  
Location: Surface records storage cabinet  
Description: Occurrence by year and month
18. DAILY MAX-MIN OF RELATIVE HUMIDITY  
Location: Surface records storage cabinet  
Description: Occurrence by year and month

19. **JWM 105-6**  
Location: Surface records storage cabinet  
Description: Monthly climatological wind factors for selected great circle routes
20. **WEATHER PARAMETERS FOR FOG CONDITIONS**  
Location: Surface records storage cabinet  
Description: Frequency at 1800L of temperature, dew point, temperature-dew point spread, wind direction and wind speed
21. **MONTHLY TAKE OFF AND CLIMB DATA**  
Location: Under plexiglass at forecasters work table  
Description: Provides monthly mean temperature, pressure altitude, climb winds, climb deviation, and 3000 ft temperatures
22. **PROBABILITY OF CEILING-VISIBILITY FOR GIVEN WEATHER CONDITIONS**  
Location: Posted above forecasters work table  
Description: Gives probability of categories A-E for given weather conditions

**SECTION B CLIMATIC BRIEF**

**The following AWS Climatic Brief for Offutt AFB has been  
extracted from AWSP 105-4 Vol II for easy reference.**

## AWS CLIMATIC BRIEF

OFFUTT AFB/C ALIA, NEBRASKA

Prepared by ETAC (DEC 1970) N 41 07 W 95 55

PERIOD: 1948-67

WBAN # 14949

WMO # 72554

ELEVATION: 1057 ft STN LTRS: KOPF

MONTH	TEMPERATURE (°F)			PRECIPITATION (in)			WIND (KT)			MEAN			MEAN NUMBER OF DAYS													
	EXTREME MAXIMUM	MEAN DAILY MAXIMUM	EXTREME MINIMUM	MEAN TOTAL	MAXIMUM IN 24 HOURS	MEAN SNOWFALL	MAX SNOWFALL IN 24 HOURS	PREVAILING DIRECTION	MEAN SPEED	EXTREME SPEED (GUST)	RELATIVE HUMIDITY (%)	DEW POINT (°F)	VAPOR PRESSURE (in Hg)	PRESSURE ALTITUDE (feet)	99.05%	PRECIP 0.01 in	PRECIP 0.5 in	PRECIP 1 in	SNOWFALL 1.5 in	SNOWFALL 2 in	THUNDERSTORMS	FOG (< 7 Miles)	TEMPERATURE (°F)	MAXIMUM	MINIMUM	MEAN CLOUDS (tenths)
	MEAN	DAILY MAXIMUM	EXTREME MINIMUM	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	
JAN	64	31	12	-20	0.9	1.6	8	NW	8	52	77	67	13.08	1700	6	#	5	2	#	11	0	0	30	6	6	
FEB	72	37	18	-16	1.2	1.8	7	19	NW	8	43	79	65	19.11	1750	6	#	4	1	1	11	0	0	25	3	6
MAR	58	44	26	-15	2.2	3.1	9	11	NW	10	60	77	61	26.14	1850	8	1	5	2	1	10	0	0	22	1	6
APR	92	62	41	17	2.5	1.8	1	4	NW	10	48	75	51	37.22	1800	8	2	1	#	4	7	4	3	6	0	6
MAY	98	74	53	28	3.7	4.3	#	4	SSE	9	62	77	53	49.35	1650	9	2	0	0	8	6	1	10	#	0	6
JUN	105	82	63	42	4.8	4.9	0	0	SSE	8	60	82	57	60.52	1550	11	3	0	0	10	5	4	20	0	0	5
JUL	106	87	67	51	4.3	5.3	0	0	SSE	7	58	83	56	65.62	1400	8	3	0	0	9	6	11	26	0	0	5
AUG	105	85	65	42	4.8	3.5	0	0	SSE	6	80	84	57	63.58	1400	10	3	0	0	9	8	9	24	0	0	4
SEP	102	76	55	29	3.4	5.0	#	#	SSE	7	42	82	55	54.42	1500	7	2	0	0	5	9	3	11	#	0	4
OCT	94	67	45	22	1.4	3.4	#	2	NW	7	46	78	51	42.27	1600	5	1	0	0	3	8	#	4	4	0	4
NOV	80	50	30	-11	1.3	1.9	2	8	NW	8	52	77	58	29.16	1750	4	1	1	#	1	7	0	#	18	#	5
DEC	66	37	19	-13	0.7	#	5	12	NW	8	53	77	63	19.11	1750	5	#	3	1	#	9	0	0	28	3	5
ANN	106	61	41	-20	31.2	5.3	32	19	NW	8	80	79	58	40.25	1700	87	18	19	6	51	97	30	98	133	13	5
EYR	18	18	18	18	18	18	18	20	20	20	9	20	20	20	20	20	18	18	18	18	18	18	18	18	18	20

## REMARKS

(RECORDS UPDATED THRU DEC 1970)

RUSSWO POR: Hrly Obs: Jan 48 - Aug 67  
Daily Obs: Jan 48 - Jun 65, Aug-Dec 65

NOTE: DATA NOT AVAILABLE, #LESS THAN 0.5 DAY, 0.5 OR 0.05 INCH, OR 0.5 PERCENT (%) AS APPLICABLE.																
FLYING WEATHER (% FREQ)		HOURS (LST)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	EYR
CIG		00 - 02	24	24	23	15	11	8	5	6	10	9	17	22	15	
less than 3000 feet and/or VSBY		03 - 05	26	28	27	18	16	10	9	9	14	11	17	25	18	
less than 3 miles		06 - 08	29	30	31	23	19	12	12	12	17	16	19	26	21	
		09 - 11	27	31	30	24	20	15	11	12	17	16	21	27	21	
		12 - 14	24	27	29	21	17	13	9	10	14	13	17	23	13	
		15 - 17	21	26	26	16	12	9	5	6	11	10	15	21	15	
		18 - 20	20	24	23	13	10	6	4	4	10	8	14	21	13	
		21 - 23	22	23	22	13	10	6	4	4	8	9	14	21	13	
		ALL HOURS	24	27	26	18	14	10	7	8	13	11	17	23	17	
CIG		00 - 02	17	17	14	9	7	5	3	4	7	6	10	14	9	
less than 1500 feet and/or VSBY		03 - 05	18	20	17	10	11	6	7	7	10	7	12	17	12	
less than 3 miles		06 - 08	20	22	21	13	12	7	9	9	13	11	13	19	14	
		09 - 11	21	22	19	12	10	7	5	7	10	9	14	18	13	
		12 - 14	16	16	16	9	6	4	2	3	6	7	10	14	9	
		15 - 17	14	15	15	7	4	3	2	2	4	4	8	11	7	
		18 - 20	14	13	7	3	2	2	2	2	4	5	8	11	7	
		21 - 23	16	15	13	7	4	4	2	2	5	6	8	13	8	
		ALL HOURS	17	18	16	10	7	5	4	4	8	7	10	15	10	
CIG		00 - 02	12	11	9	6	4	3	2	2	4	3	8	9	6	
less than 1000 feet and/or VSBY		03 - 05	13	14	11	7	6	4	5	5	7	5	11	8	8	
less than 2 miles		06 - 08	16	15	15	8	7	4	5	6	8	7	9	13	9	
		09 - 11	17	14	13	7	5	3	2	4	5	6	9	12	8	
		12 - 14	12	11	10	5	3	2	1	1	4	3	5	9	6	
		15 - 17	10	10	9	4	1	1	#	1	2	3	5	8	5	
		18 - 20	10	11	9	4	2	1	1	1	2	3	5	8	5	
		21 - 23	12	11	8	5	2	2	1	1	3	4	6	9	5	
		ALL HOURS	13	12	11	6	4	3	2	3	4	4	7	10	6	
CIG		00 - 02	2	3	2	#	#	0	#	#	1	1	2	1	1	
less than 200 feet and/or VSBY		03 - 05	3	3	1	1	1	1	1	1	1	2	3	2	2	
less than 1/2 mile		06 - 08	5	4	2	1	1	1	1	1	1	2	3	2	2	
		09 - 11	3	2	2	#	#	#	#	#	0	#	1	2	1	
		12 - 14	2	1	1	#	0	#	#	0	0	0	1	1	1	
		15 - 17	1	1	1	#	0	#	0	#	0	#	2	1	1	
		18 - 20	1	2	1	#	#	0	#	#	0	#	1	3	1	
		21 - 23	2	2	1	#	0	0	#	0	#	#	1	3	1	
		ALL HOURS	2	2	1	#	#	#	#	#	#	#	1	1	2	

## TAF TIPS

### Explanation of Data Tables

#### FLYING WEATHER

Frequency of occurrence of each of 5 categories is given. The sum of 5 category values for each month is 100, since observations which meet criteria of two categories are considered only in category with more-restricted limits. Values were computed from RUSSWO, Part D, and are compatible with values obtained from PP tables, though some differences occur because of different periods of record.

Caused by: Relative importance of the 3 components contributing to the "CIG a/o VSBY" values in categories D, C, B and A were computed from RUSSWO, Part D, tables.

Peak Occur: Time of peak occurrence determined from PP tables and recorded as the center hour of 3 hour period (see LST & HRS Code).

Percy: Normal persistence was determined from PP tables by counting number of consecutive hours

LST & HRS Code

that initial category	00-02	01	- Dash indicates consecutive, equally likely periods.
is the most likely or	03-05	04	
the equally likely category	06-08	07	/ A slant indicates non-consecutive, equally likely periods.
on each of the 8 monthly pages. Values were ordered and two values at each end of distribution deleted.	09-11	10	
there was no occurrence of category on at least 3 of 8 pages, i.e., x-x-x-1-1-3-5-6	12-14	13	x' Indicates no occurrence.
	15-17	16	
	18-20	19	
	21-23	22	

#### VISIBILITY AND WEATHER CONDITIONS

Caused by: Relative importance of weather factors contributing to conditions noted immediately above. Their sum may exceed 100, since parameters may occur simultaneously.

#### SURFACE WIND DATA

Prevailing Direction: Prevailing direction was determined by inspection of "total 4 kts and over" column of Surface Wind pages of RUSSWO, Part C;

direction recorded is that of middle class of 3 adjacent classes producing largest frequency of occurrence. Percent frequency of speed criterion is the sum for the 3 classes used in determination of prevailing direction.

TAF TIPS FOR: OFFUTT AFB, NE

FLYING WEATHER (% frequency, all hours) (Source: RUSSWO, Part D; PP tables. POR Jan 48 - Aug 67)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
<u>CATEGORY E (CIG <math>\geq</math> 10,000 ft and VSBY <math>\geq</math> 6mi)</u>													
CIG and VSBY	62.6	60.7	56.9	64.0	66.4	72.6	78.8	78.6	72.1	77.5	70.5	64.3	68
<u>CATEGORY D (&lt;10,000/6<del>3</del>000/3)</u>													
CIG a/o VSBY	13.2	12.9	16.7	18.1	19.2	17.6	13.9	13.6	15.1	11.1	12.8	12.3	14
Caused By	CIG Only	9.1	9.0	14.0	16.6	17.6	16.3	12.0	11.3	12.2	9.0	11.0	9.8
	VSBY Only	3.0	2.8	1.8	0.7	0.8	0.6	1.3	1.6	1.9	1.7	1.4	1.7
Peak Occurrence (LST)	16/22	07	16	16	16	07	04	07	07	07	07	07	07
Normal Persistence (hrs)	3-4	2-6	6-8	4-7	3-5	2-3	2-4	2-3	5-6	3-5	4	4-5	
Max Persistence (hrs)	8	9	10	8	6	5	5	7	10	5	6	6	
Time Max Percy (LST)	16	22	01	22	10	01	22	22	22	01/10	19	22	

II-B-5

## TAF TIPS FOR: OFFUTT (Cont'd)

FLYING WEATHER (% frequency, all hours) (Source: RUSSWO, Part D; PP tables. POR Jan 48 - Aug 67)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
<u>CATEGORY C (&lt;3000/3 ≥1000/2)</u>													
	CIG a/o VSBY	11.7	14.3	15.9	12.4	10.8	7.1	5.1	5.1	8.4	7.1	9.7	13.5 10.1
Caused By	CIG Only	10.4	12.9	14.8	11.9	10.4	6.9	4.8	4.7	7.9	6.8	9.2	12.5 9.4
	VSBY Only	0.5	0.6	0.3	0.1	0.2	0.1	0.3	0.4	0.3	0.3	0.2	0.4 0.3
	CIG and VSBY	0.8	0.8	0.8	0.4	0.2	0.1	0.0	0.0	0.2	0.0	0.3	0.6 0.4
Peak Occurrence (LST)	04	10	13	10	10	10	13	13	10	13	13	13	
Normal Persistence (hrs)	6-8	7-8	7-15	8-15	6-12	4-7	4-10	4-5	8-12	5-10	7-15	9-11	
Max Persistence (hrs)	10	10	18	21	15	10	15	7	15	15	18	11	
Time Max Percy (LST)	19	01	19	19	22	01	22	19	19/22	22	16	16/19/22	
<u>CATEGORY B (&lt;1000/2 ≥200/½)</u>													
	CIG a/o VSBY	10.1	10.1	9.2	5.2	3.4	2.5	3.0	2.5	4.2	3.8	5.8	7.9 5.5
Caused By	CIG Only	3.9	4.5	4.2	3.8	2.5	1.7	1.5	1.7	3.1	2.7	3.7	3.6 3.1
	VSBY Only	2.0	1.7	1.9	0.4	0.3	0.3	0.3	0.6	0.3	0.4	0.6	1.3 0.8
	CIG and VSBY	4.2	3.9	3.1	1.0	0.6	0.5	1.2	0.2	0.8	0.7	1.5	3.0 1.6
Peak Occurrence (LST)	10	10	07	07	07	07	07	07	07	07	10	10	07
Normal Persistence (hrs)	10-12	11-12	7-11	6-15	3-8	3-15	1-4	2-8	5-12	5-10	7-12	8-15	
Max Persistence (hrs)	15	15	12	15	11	18	11	12	15	18	18	21	

## TAF TIPS FOR: OFFUTT (Cont'd)

FLYING WEATHER (% frequency, all hours) (Source: RUSSWO, Part D; PP tables. POR Jan 48 - Aug 67)

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC YR

CATEGORY B (Cont'd)

Time Max Percy (LST) 10/13 19 19/22 13/16 22 19 22 19/22 16 16 16 16

CATEGORY A (<200 $\frac{1}{2}$ )

CIG a/o VSBY	2.4	2.0	1.3	0.3	0.2	0.2	0.2	0.2	0.5	1.2	2.0	0.9
CIG Only	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.1
Caused By	VSBY Only	1.0	0.9	1.0	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.8
CIG and VSBY	1.0	0.9	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.7	0.9

## Peak Occurrence (LST)

Normal Persistence (hrs)	2-4	2-5	1-3	0-2	X	X-1	X-0	0	X-0	0-1	4-9	1-4
Max Persistence (hrs)	11	8	6	5	3	2	2	4	1	5	15	8
Time Max Percy (LST)	22	01	04	19	04	01/04	07	04	07	22	13	22

### SECTION C THUNDERSTORMS

The following Tables and associated graphs are provided to acquaint the forecaster with preferred times and months of thunderstorm occurrence and their duration. Two additional graphs are provided relative to Tornado occurrence.

A quick review of the information will show that June is the preferred month for thunderstorm and tornado activity with the maximum per month and the longest duration. Additionally, it is evident that the evening hours (1900L to 0500L) show maximum activity.

LISTING OF NUMBER OF DAYS PER MONTH WHERE AT LEAST ONE THUNDERSTORM WAS REPORTED ON THE RECORD OBSERVATION (17 yrs. of data)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1951	0	2	1	6	7	10	9	14	3	2	0	0
1952	0	0	1	3	8	12	8	7	1	2	1	0
1953	0	0	4	0	3	9	7	3	1	2	1	0
1954	0	1	1	7	5	6	7	15	6	5	0	0
1955	1	0	0	4	2	9	4	3	2	0	0	0
1956	0	0	0	2	3	7	7	9	4	3	0	0
1957	0	0	2	2	5	11	6	13	3	3	0	0
1958	0	0	0	0	7	4	4	14	4	5	2	0
1959	0	1	1	3	13	9	5	14	5	2	1	0
1960	0	0	0	1	1	7	11	5	10	4	2	0
1961	0	1	3	1	7	7	7	5	8	4	0	0
1962	0	2	2	2	13	6	9	9	6	1	0	0
1963	0	0	4	5	6	8	10	9	4	5	1	0
1964	0	0	0	0	5	10	12	10	8	5	3	2
1965	0	1	1	5	11	13	10	7	8	0	2	0
1966	0	1	1	1	8	10	7	6	5	1	1	0
1967	1	0	2	3	2	16	9	7	6	6	0	0
<b>TOTAL</b>	<b>2</b>	<b>9</b>	<b>24</b>	<b>57</b>	<b>114</b>	<b>160</b>	<b>134</b>	<b>145</b>	<b>77</b>	<b>41</b>	<b>9</b>	<b>1</b>
<b>AVG</b>	<b>0.1</b>	<b>0.5</b>	<b>1.4</b>	<b>3.4</b>	<b>6.7</b>	<b>9.4</b>	<b>7.9</b>	<b>8.5</b>	<b>4.5</b>	<b>2.4</b>	<b>0.5</b>	<b>0.1</b>

TABLE 2 TSTM DAYS  
II-C-2

PERIOD OF RECORD: 1951-1967

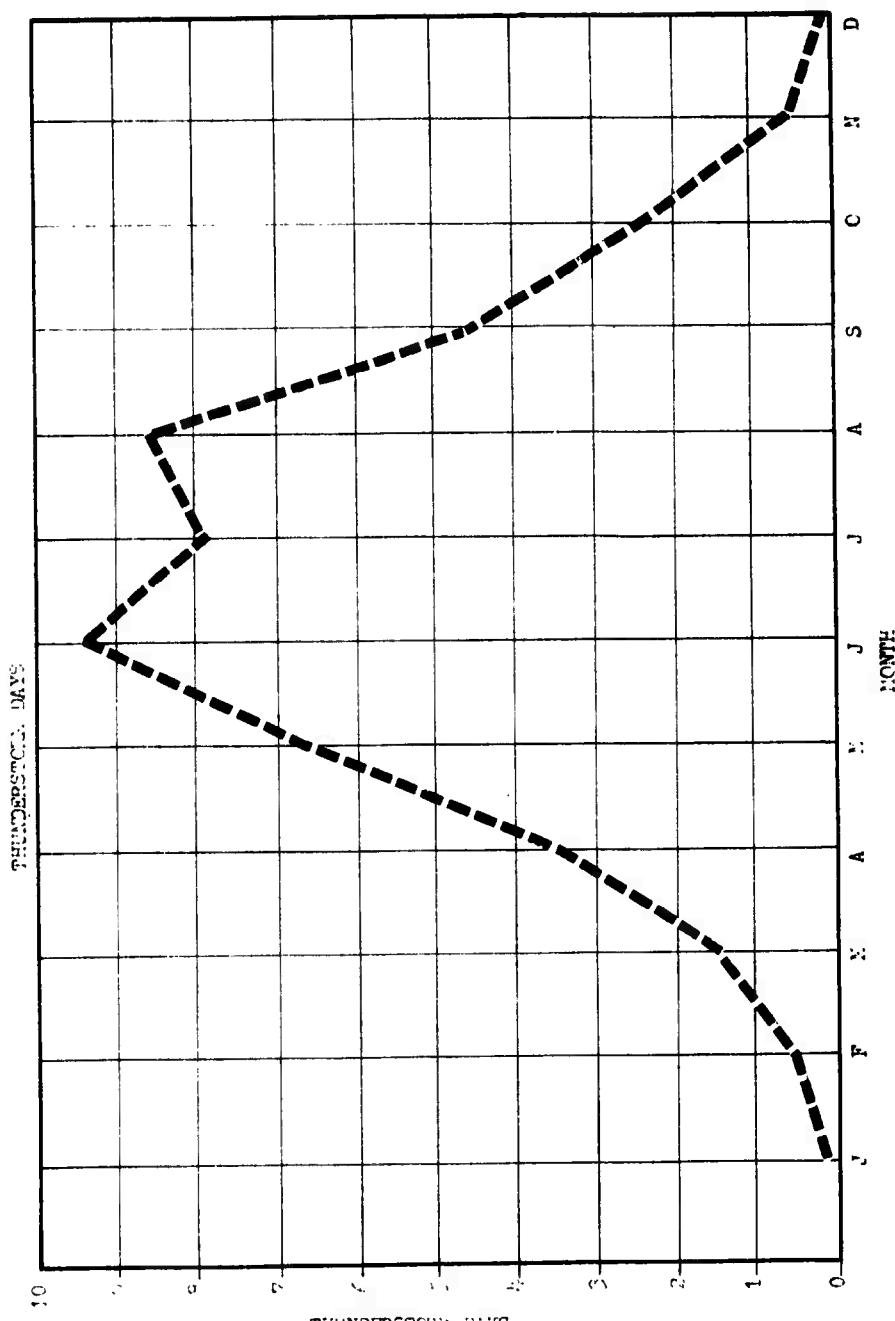


CHART 1 TSTM DAYS  
11-6-3

## NUMBER OF THUNDERSTORM OBSERVATIONS PER MONTH (RECORD OBSERVATIONS ONLY) FROM 1951-1967

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1951	0	5	2	11	18	27	24	28	7	4	0	0
1952	0	0	1	3	16	46	14	36	3	0	1	0
1953	0	0	6	0	8	21	8	8	1	4	1	0
1954	0	4	1	14	17	18	13	48	9	11	0	0
1955	1	0	0	8	3	28	8	3	6	0	0	0
1956	0	0	0	4	7	20	14	24	10	5	0	0
1957	0	0	4	5	10	33	20	35	8	5	0	0
1958	0	0	0	16	7	42	11	19	3	0	0	0
1959	0	1	3	8	47	18	14	43	11	4	3	1
1960	0	0	1	1	18	25	13	26	8	4	0	0
1961	0	1	4	1	14	17	13	9	21	6	0	0
1962	0	2	3	2	40	9	29	19	12	1	0	0
1963	0	0	9	12	23	24	17	20	8	6	1	0
1964	0	0	0	23	27	43	40	25	20	3	4	0
1965	0	1	1	18	41	39	28	15	25	0	6	0
1966	0	1	1	2	15	32	24	15	8	3	1	0
1967	2	0	2	8	5	71	28	17	18	0	0	0
TOTAL	3	15	38	136	316	478	349	382	194	59	17	1
Avg	0.2	0.9	2.2	8.0	18.6	28.1	20.5	22.5	11.4	3.5	1.0	0.1

TABLE 3 TSTM OBS  
II-C-4

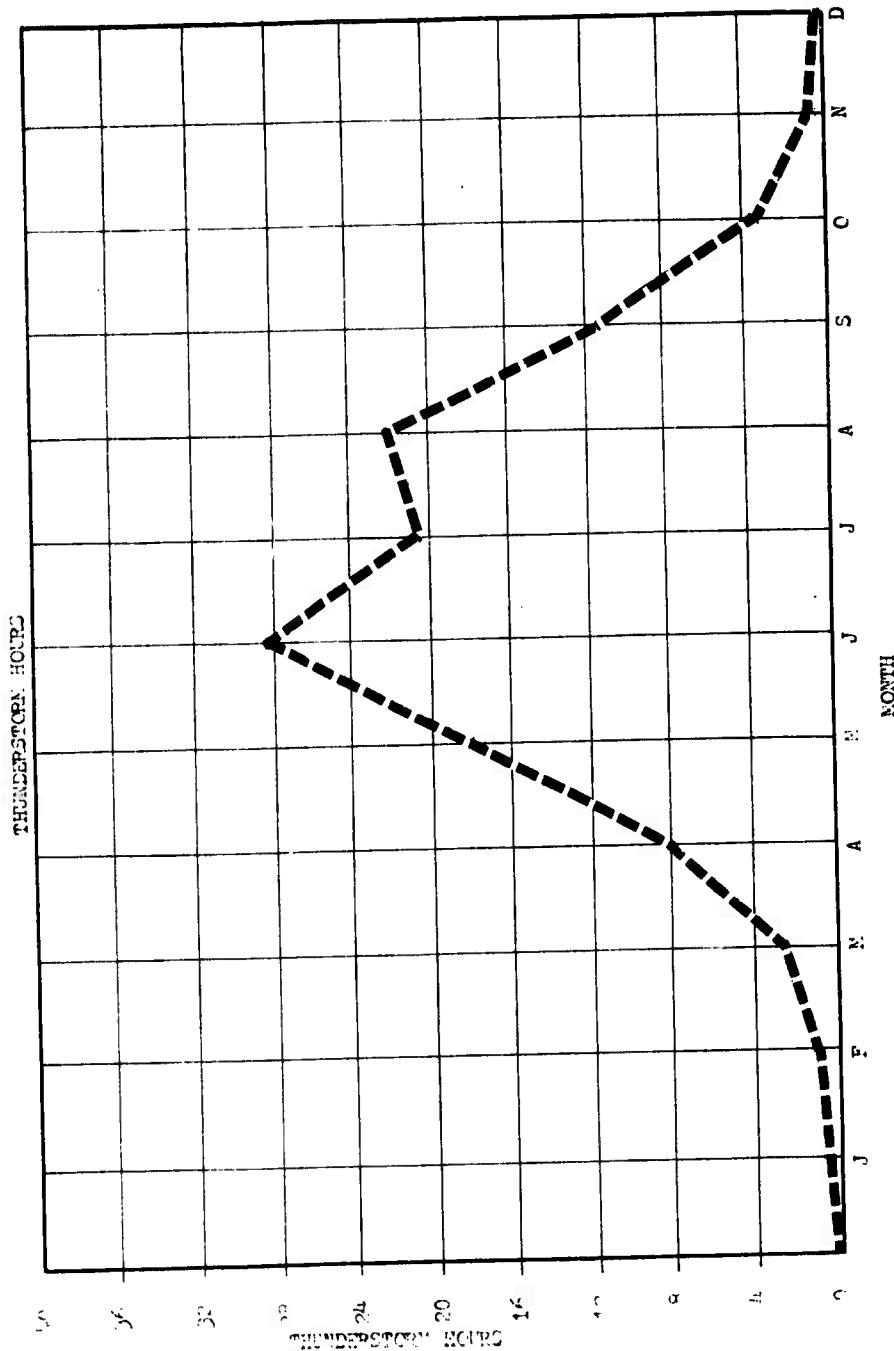


CHART 2 TSTM OBS  
II-C-5

## AVERAGE NUMBER OF THUNDERSTORM HOURS PER THUNDERSTORM DAY

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TOTAL	3	15	38	136	316	478	349	382	194	59	17	1
THURST. HOURS												
TOTAL	2	9	24	57	114	160	134	145	77	41	9	1
THURST. DAYS												
MEAN	1.5	1.7	1.6	2.4	2.8	3.0	2.6	2.6	2.5	1.4	1.9	1.0
MEAN DURA- TION												

(NUMBER OF HOURS DIVIDED BY NUMBER OF DAYS)

TABLE 4 TSTM HOURS  
II-C-6

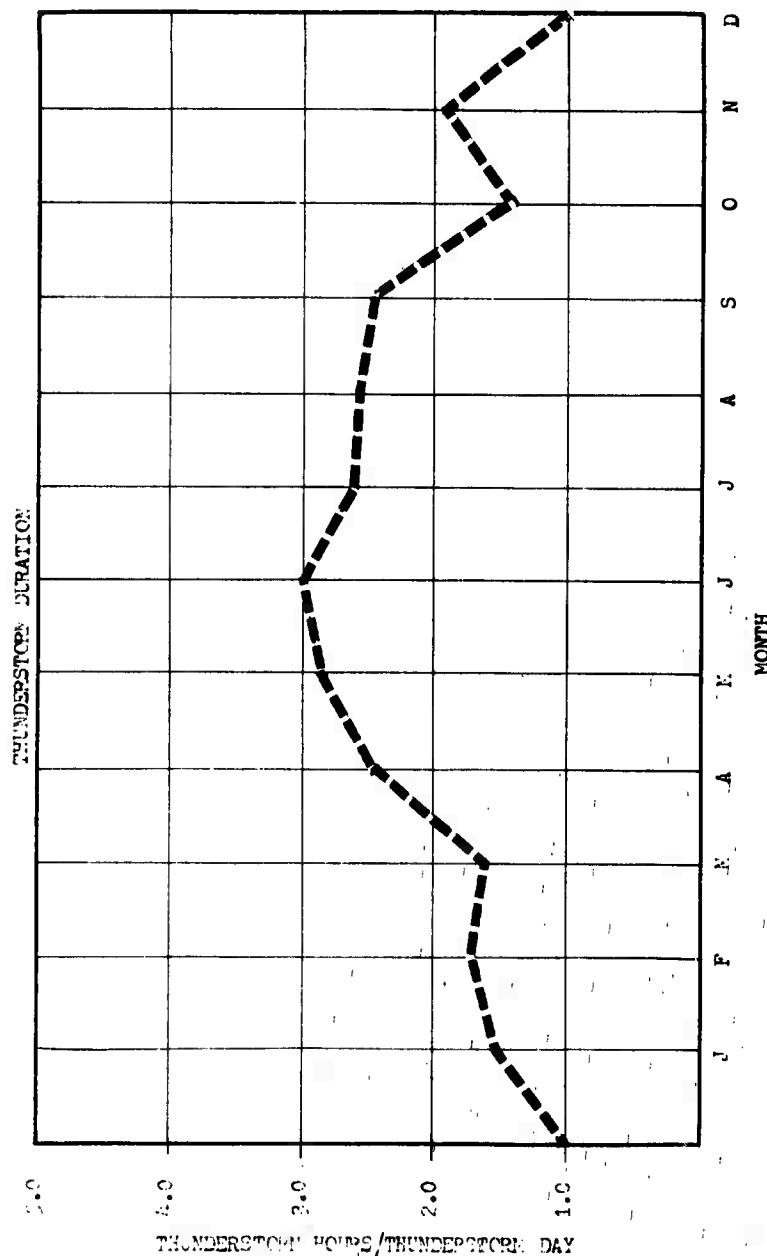


CHART 3 TSTM HOURS

11-C-7

PERCENT OF TIME WITH THUNDERSTORMS: MEAN DIURNAL THUNDERSTORM DISTRIBUTION BASED ON THE  
PERCENTAGE OF TIME OBSERVED ON A RECORD OBSERVATION TO THE TOTAL NUMBER OF RECORD OBS. (17 YRS.)

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
00	0.0	0.0	0.4	1.6	4.4	5.2	4.8	5.2	2.5	1.0	0.6	0.0
01	0.0	0.0	0.4	2.2	2.8	4.8	4.0	5.0	2.5	1.2	0.4	0.0
02	0.2	0.2	0.4	2.2	4.0	6.7	4.0	5.0	1.5	0.4	0.4	0.0
03	0.0	0.2	0.2	2.0	4.6	5.8	6.5	5.2	2.5	0.4	0.2	0.0
04	0.0	0.2	0.4	1.8	4.2	6.2	4.8	5.6	2.7	0.2	0.4	0.0
05	0.2	0.6	0.6	1.4	3.2	4.4	3.0	4.4	2.1	0.8	0.2	0.0
06	0.0	0.4	0.4	0.6	2.4	3.5	2.0	2.8	2.1	1.0	0.0	0.0
07	0.0	0.0	0.4	1.2	1.8	3.7	2.4	1.6	1.0	0.4	0.0	0.0
08	0.0	0.0	0.4	1.0	1.2	1.5	2.0	1.8	0.6	0.2	0.0	0.0
09	0.0	0.0	0.0	1.0	1.6	2.3	1.8	1.4	0.2	0.8	0.0	0.0
10	0.0	0.0	0.0	0.2	2.0	1.2	1.0	1.8	0.0	0.4	0.0	0.0
11	0.0	0.0	0.4	0.0	1.0	1.2	1.0	0.8	0.4	0.2	0.0	0.0
12	0.2	0.2	0.2	0.0	1.4	1.7	1.6	0.8	0.4	0.2	0.0	0.0
13	0.0	0.2	0.2	0.2	0.4	1.4	2.3	1.2	1.0	0.4	0.6	0.0
14	0.0	0.2	0.4	0.4	1.6	1.7	0.6	0.6	0.4	0.2	0.0	0.0
15	0.0	0.0	0.4	0.8	1.0	1.0	1.0	1.2	0.2	0.6	0.0	0.0
16	0.0	0.0	0.0	1.4	1.2	2.7	1.4	1.8	0.4	0.2	0.0	0.0
17	0.0	0.0	0.0	0.0	1.0	1.2	2.1	1.0	2.0	1.0	0.4	0.0
18	0.0	0.2	0.4	1.4	1.8	2.3	1.4	2.8	0.6	0.2	0.2	0.2
19	0.0	0.2	0.2	0.8	2.8	2.3	3.2	4.0	1.5	0.0	0.0	0.0
20	0.0	0.0	0.4	1.6	2.8	4.8	3.2	4.6	2.7	0.4	0.0	0.0
21	0.0	0.0	0.8	1.2	5.0	5.4	3.2	4.0	3.5	0.6	0.0	0.0
22	0.0	0.0	0.2	1.6	4.0	5.4	3.6	4.0	3.5	0.8	0.2	0.0
23	0.0	0.4	0.6	1.4	4.8	6.5	5.4	3.7	1.2	0.4	0.0	0.0
ALL HRS	0.0	0.1	0.3	1.1	2.6	3.5	2.7	3.1	1.5	0.5	0.1	0.0

TABLE 5 TSTM DISTRIBUTION  
II-C-8

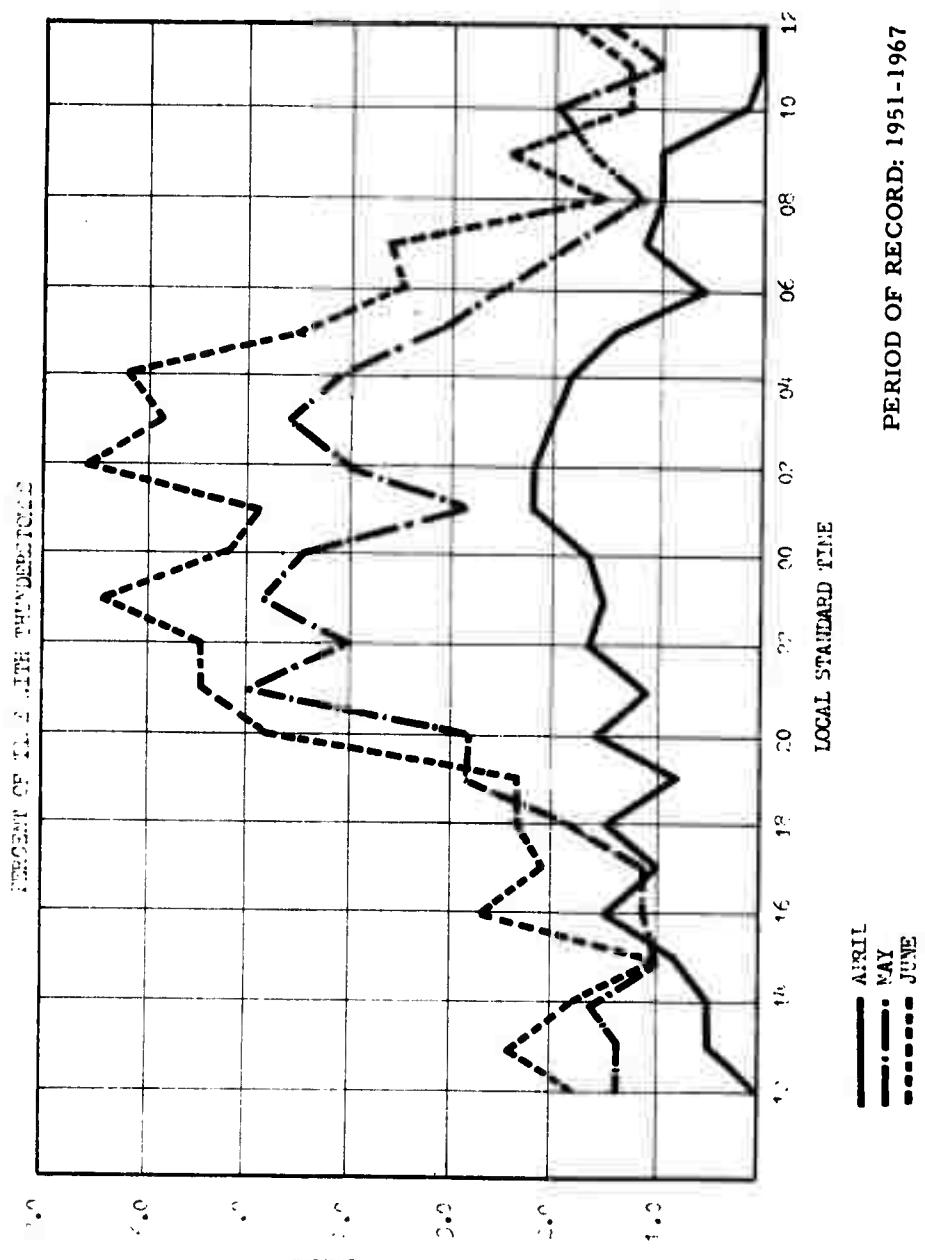


CHART 4 TSTM DISTRIBUTION  
11-8-9

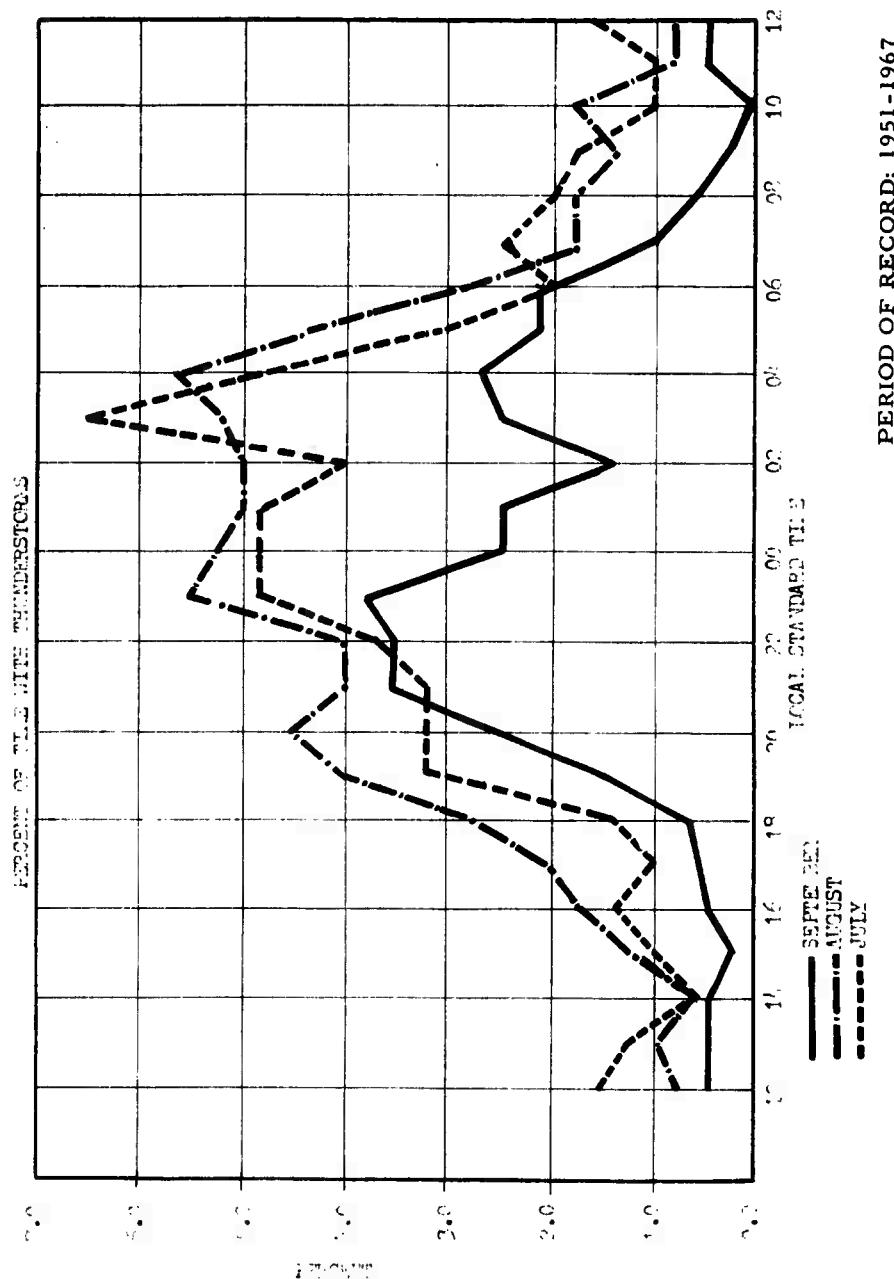


CHART 5 TSTM DISTRIBUTION  
11-0-10

PERIOD OF RECORD: 1951-1967

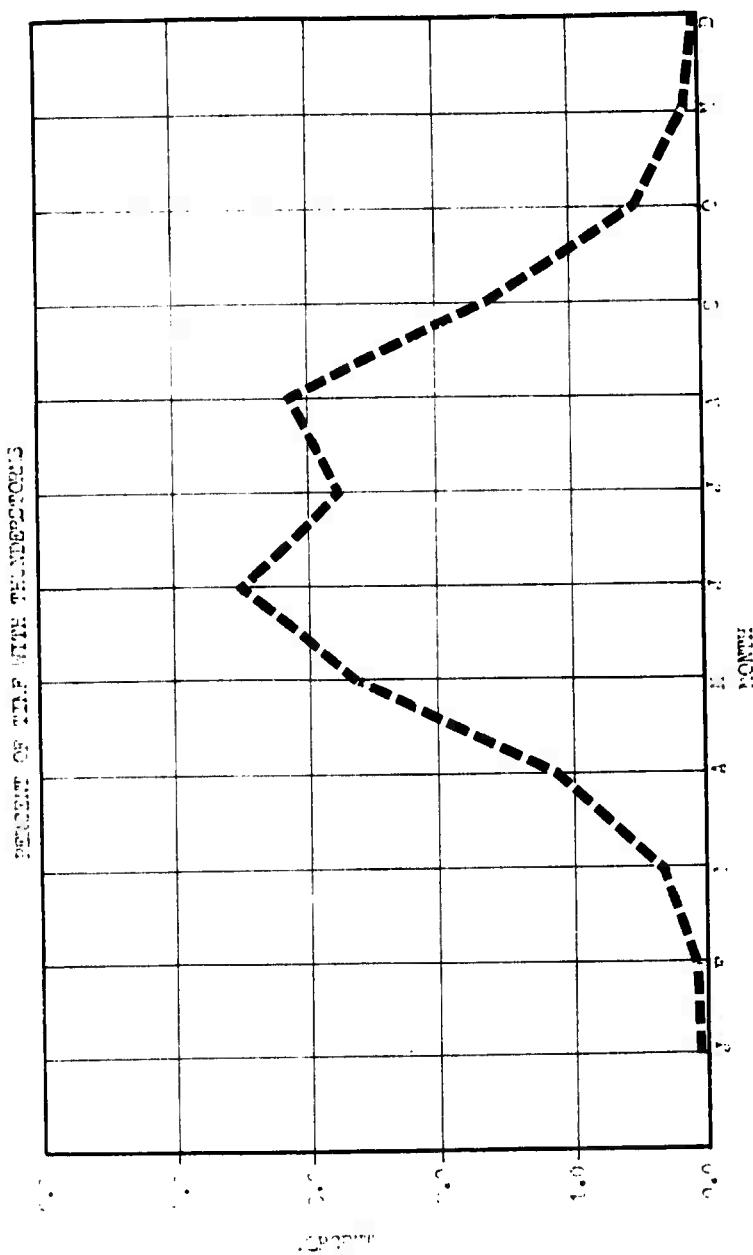


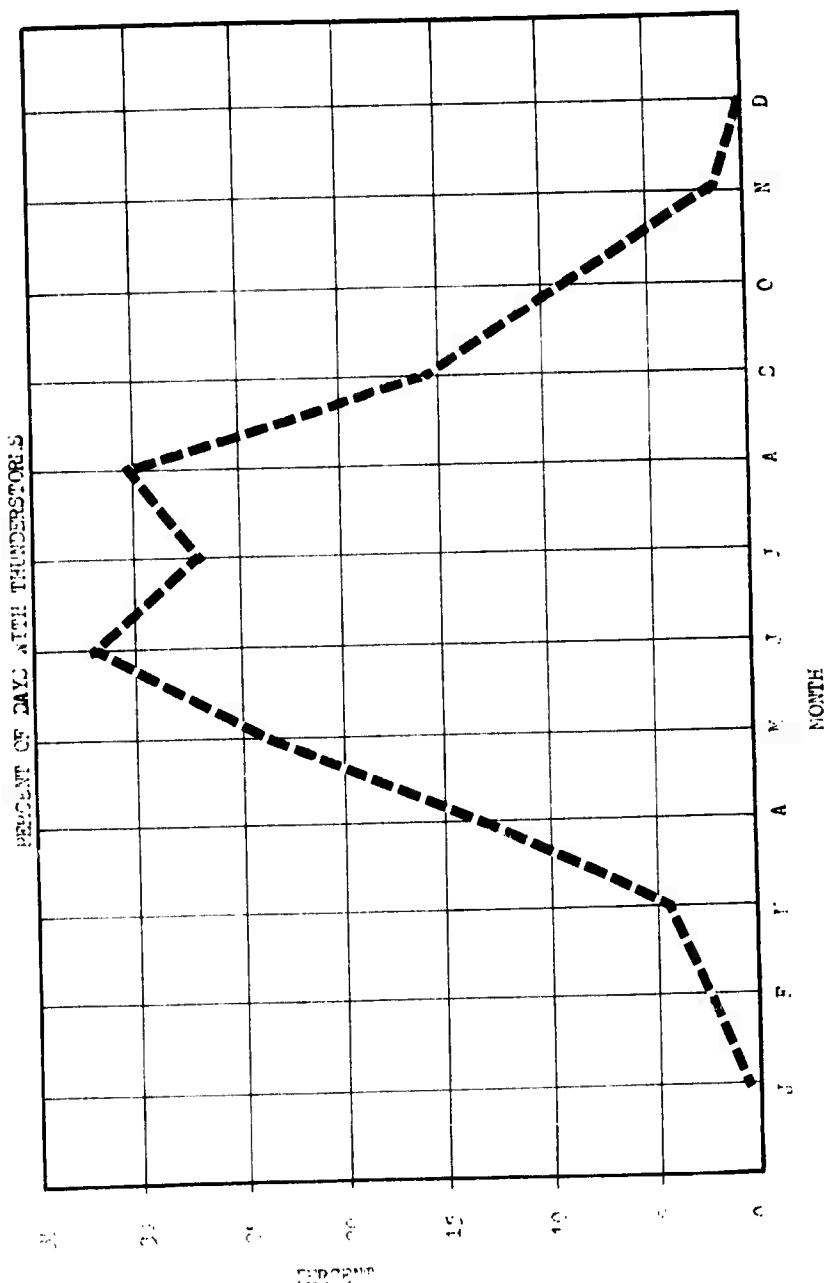
CHART 6 TSTM DISTRIBUTION  
11-8-11

PERCENT OF DAYS WITH HAILSTORMS ACCORDING TO THE DAY OF THE DAY OBSERVATION BASED ON DAILY OBSERVATIONS FOR 17 YEARS FROM JAN 48 TO JUN 65.

THW	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.2	2.0	4.5	13.7	24.2	32.4	27.7	30.1	16.7	8.6	2.2	0.2	
HAIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.0	0.6	0.9	2.6	3.4	2.6	0.9	0.4	0.2	0.5	0.4	0.0	

TABLE 6 TSTM DAYS  
II-C-12

PERIOD OF RECORD: JAN 1948 - JUN 1965



## PERCENT FREQUENCY OF OCCURRENCE OF THUNDERSTORMS BY HOUR AND MONTH

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
12	35	06	03	-	02	01	02	01	05	06	-	-
13	-	06	05	02	02	05	02	01	06	06	-	-
14	-	06	05	02	02	05	02	01	06	06	-	-
15	15	17	18	19	20	21	22	23	08	05	02	03
16	16	19	19	20	21	22	23	08	05	02	03	04
17	17	18	19	20	21	22	23	08	05	02	03	04
18	18	19	19	20	21	22	23	08	05	02	03	04
19	19	19	19	20	21	22	23	08	05	02	03	04
20	20	21	21	22	23	22	23	08	05	02	03	04
21	21	22	21	22	23	22	23	08	05	02	03	04
22	22	23	21	22	23	22	23	08	05	02	03	04
23	23	08	05	02	03	04	05	08	05	02	03	04
00	08	05	02	03	04	05	06	07	08	05	02	03
01	05	02	03	02	03	04	07	09	10	08	10	07
02	05	02	03	02	03	04	07	09	10	08	10	07
03	05	02	03	02	03	04	07	09	10	08	10	07
04	05	02	03	02	03	04	07	09	10	08	10	07
05	05	02	03	02	03	04	07	09	10	08	10	07
06	05	02	03	02	03	04	07	09	10	08	10	07
07	05	02	03	02	03	04	07	09	10	08	10	07
08	05	02	03	02	03	04	07	09	10	08	10	07
09	05	02	03	02	03	04	07	09	10	08	10	07
10	05	02	03	02	03	04	07	09	10	08	10	07
11	05	02	03	02	03	04	07	09	10	08	10	07

TABLE 7 DIURNAL FREQUENCY  
II-C-14

PERIOD OF RECORD: 1951-1967

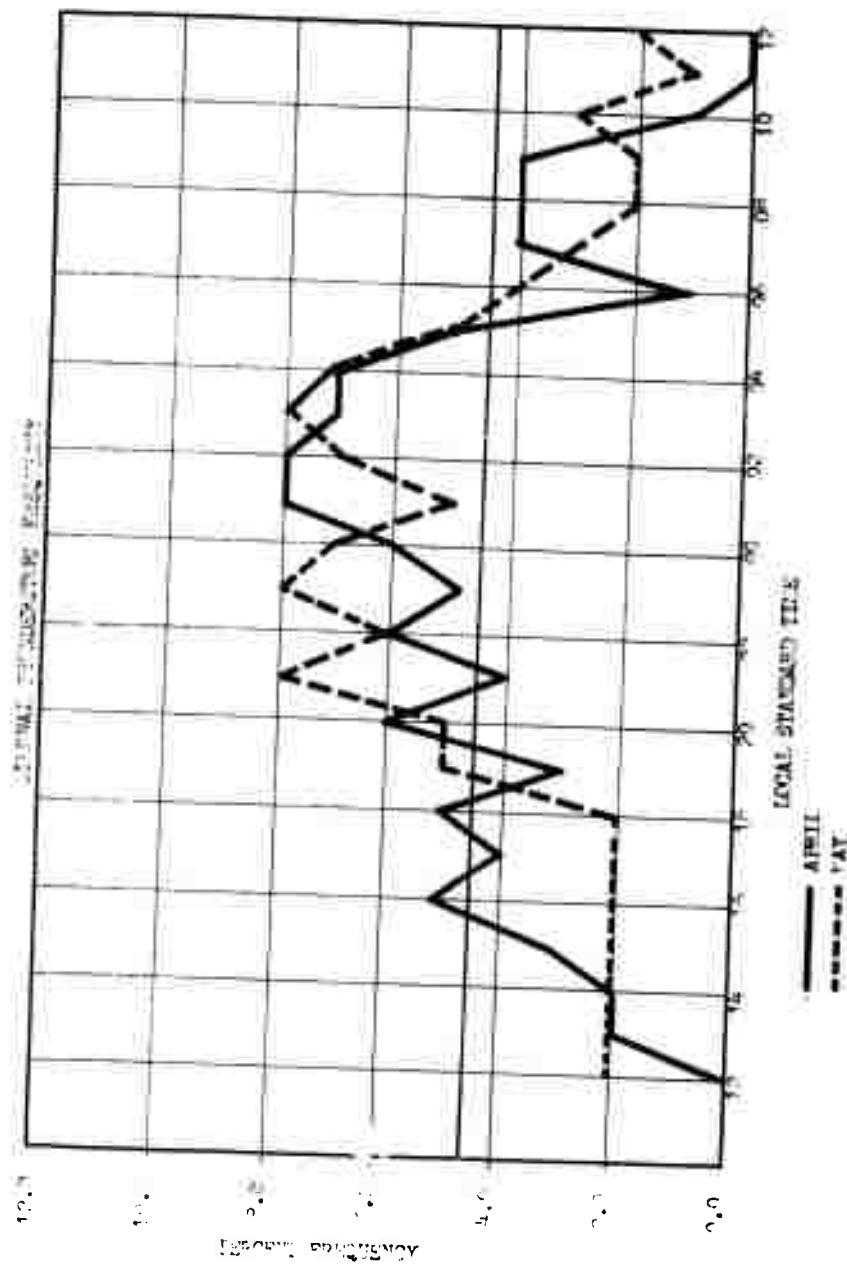
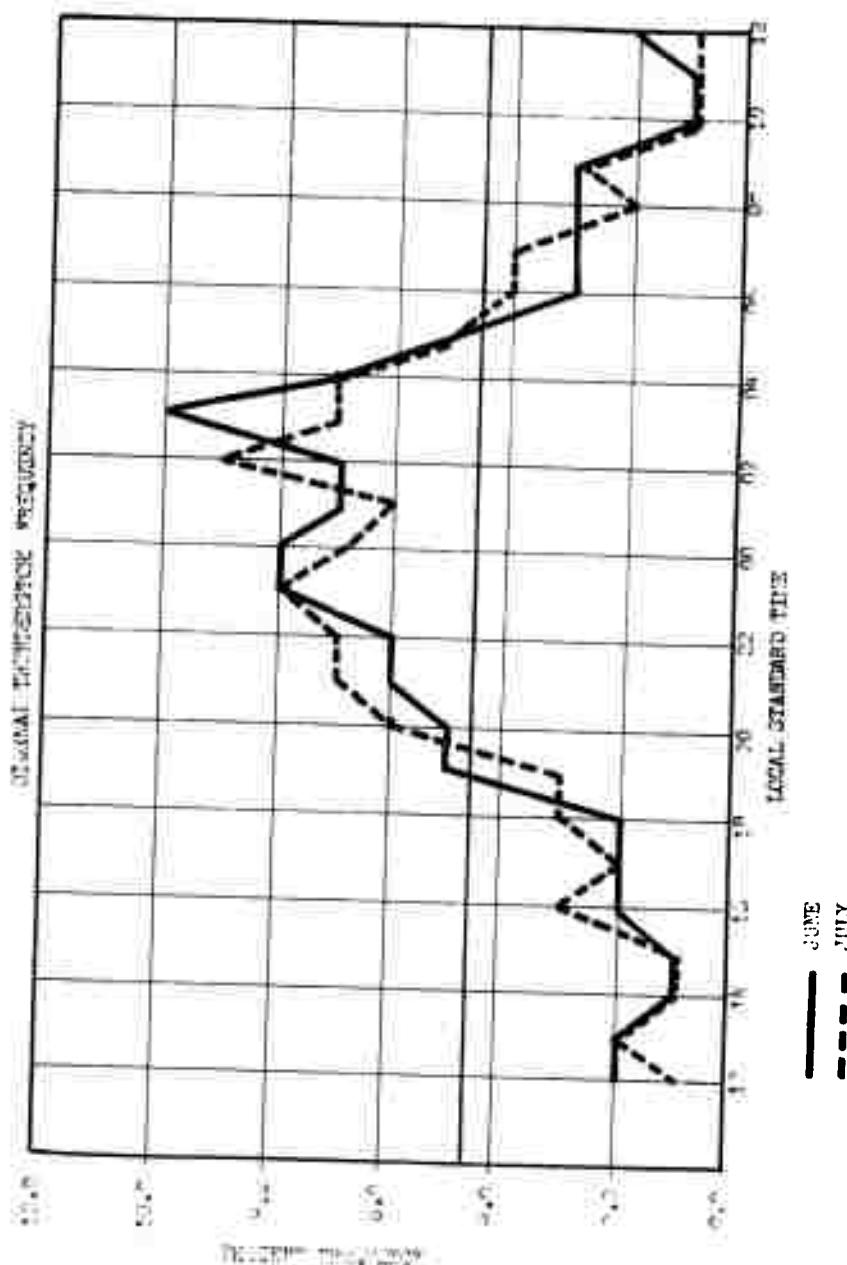


CHART 8 DIURNAL FREQ  
II-C-15



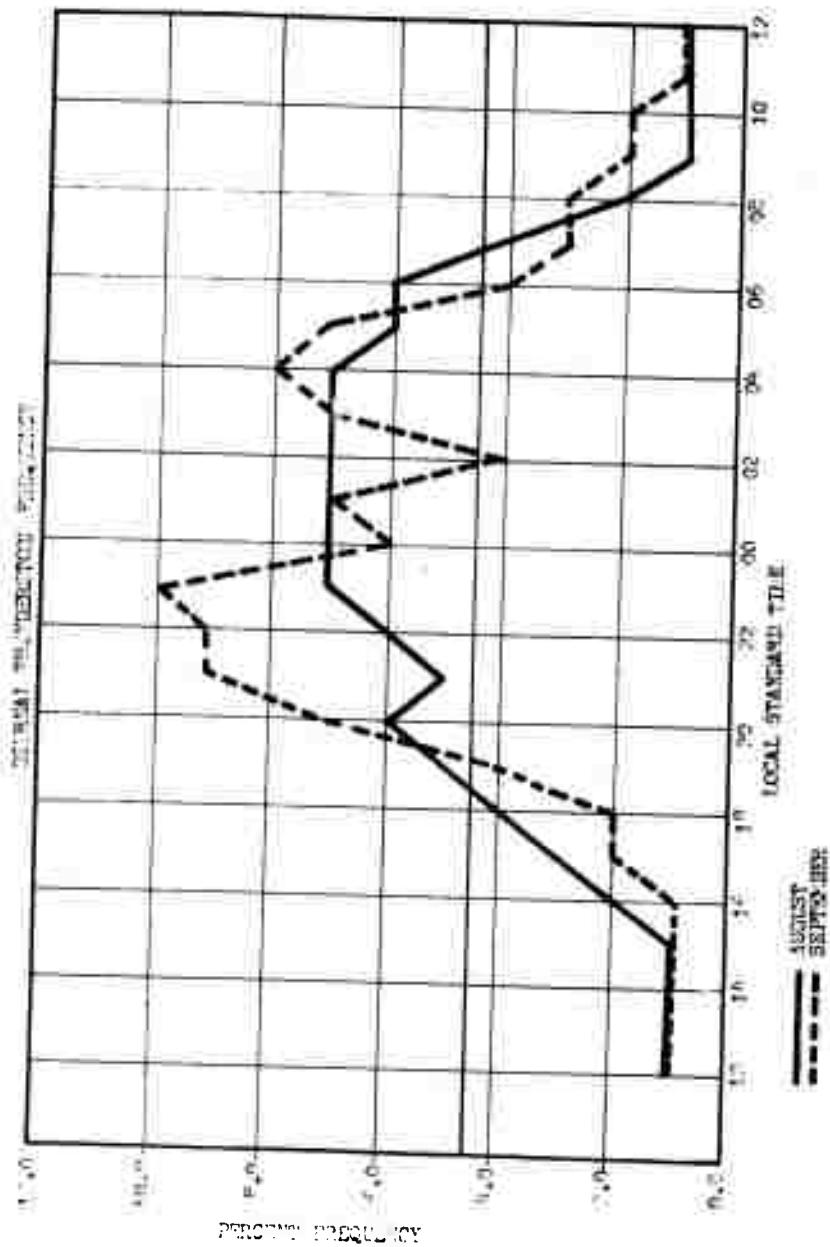


CHART 10 DIURNAL FREQ  
II-C-17

THUNDERSTORM RECORDS

A...MOST CONTINUOUS HOURLY OBSERVATIONS REPORTING T OR TRW ON ONE DAY  
 B...MOST T OR TRW OBSERVATIONS REPORTED IN ONE DAY ON RECORD OBS  
 (ALL TIMES LOCAL)

MONTH	A.		B.	
JANUARY	5 JAN 1955	02	24 JAN 1967	24hrs
	24 JAN 1967	05		
	24 JAN 1967	12		
FEBRUARY	28 FEB 1951	03-05	28 FEB 1951	3hrs
	19 FEB 1954	12-14	19 FEB 1954	3hrs
MARCH	18 MAR 1963	11-14	18 MAR 1963	4hrs
APRIL	8 APR 1965	01-09	28 APR 1963 8 APR 1965	9Hrs 9Hrs
MAY	28 MAY 1962	08-21	28 MAY 1962	15Hrs
	22 MAY 1965	00-10	22 MAY 1965	14Hrs
JUNE	24 JUN 1963	04-13	9 JUN 1967	14Hrs
JULY	30 JUL 1958	00-08	26 JUL 1967	11Hrs
AUGUST	22 AUG 1954	16-00	22 AUG 1954	9Hrs
SEPTEMBER	2 SEP 1961	17-00	2 SEP 1961	8Hrs
OCTOBER	20 OCT 1954	00-05	20 OCT 1954	5Hrs
NOVEMBER	1 NOV 1964	00-01	11 NOV 1965	6Hrs
	15 NOV 1964	03-04		
	11 NOV 1965	04-05		
		17-18		
		23-00		
DECEMBER	26 DEC 1959	18	26 DEC 1959	1hr

TABLE 8 TSTM RECORDS

II-0-18

PERIOD OF RECORD: 1951-1967

# NEBRASKA

## A V G   N O   O F   T O R N A D O E S 1916-1963

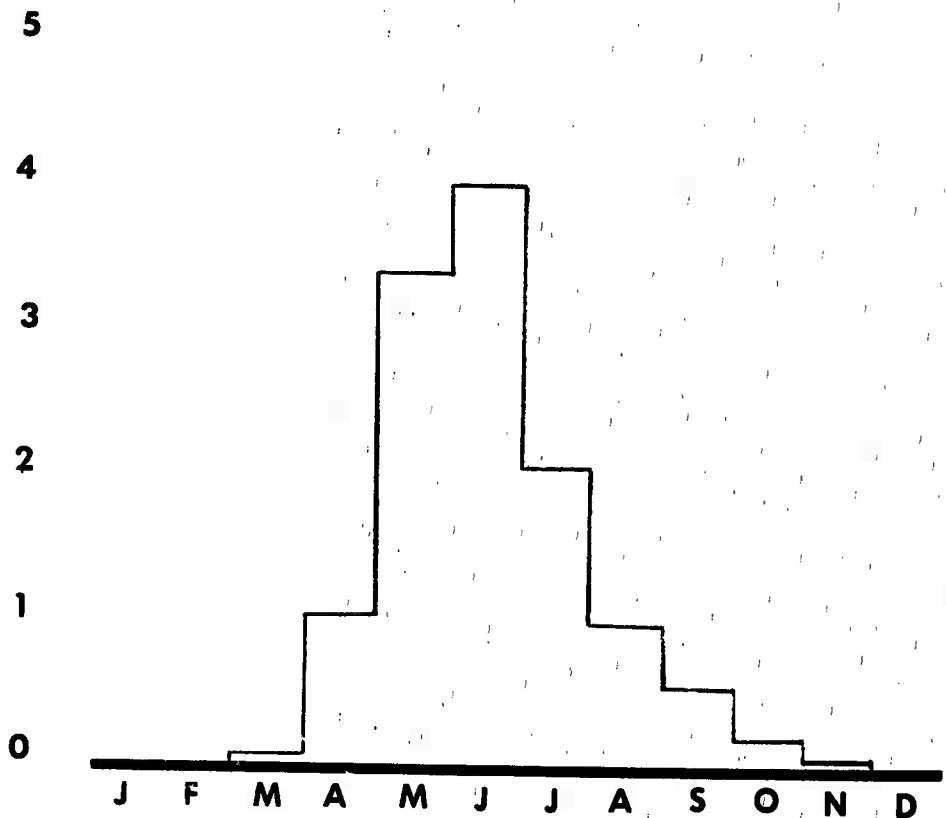


CHART 11 TORNADO FREQ  
11-C-19

NEBRASKA

DIURNAL OCCURRENCE OF  
TORNADOES 1916 - 1958

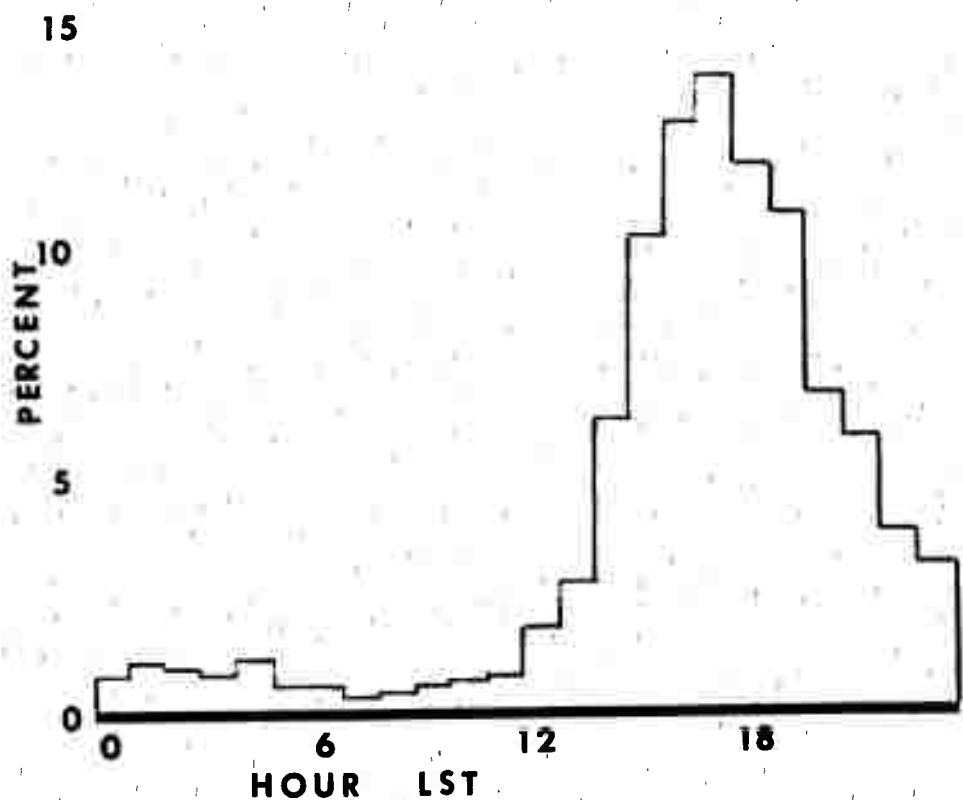


CHART 12 DIURNAL TORNADO  
II-C-20

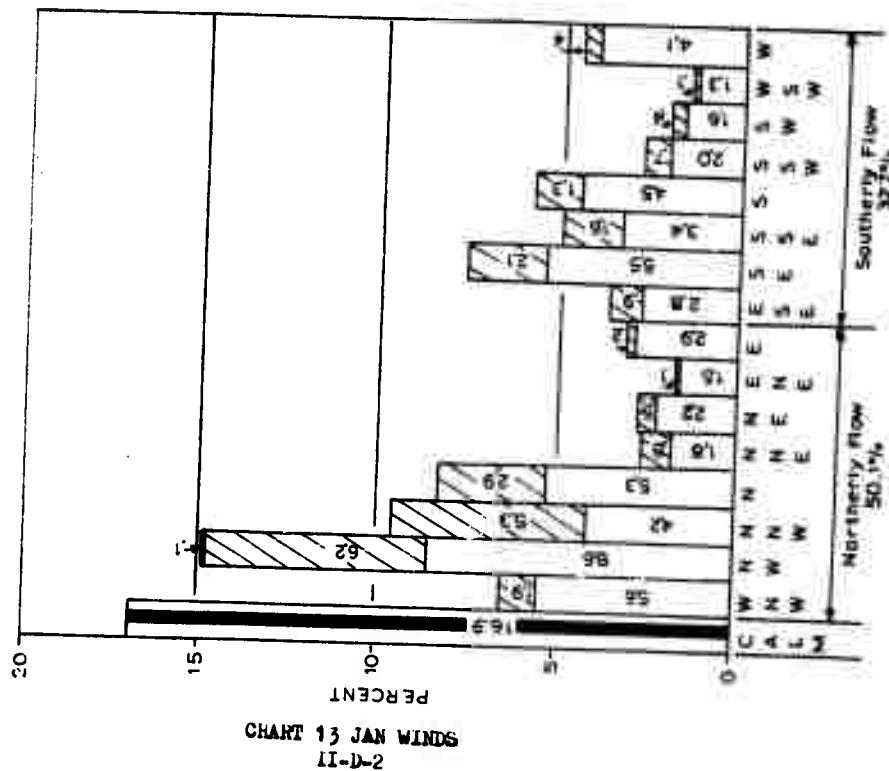
#### SECTION D WINDS

The following set of histograms depicts a frequency distribution of wind velocity and direction by month. Throughout the year two maxima exist: NW being dominant from October through April with SE dominant for the remainder of the year. The NW winds normally result from cold frontal passages and continue while the advancing surface high remains north. Wind velocities are highest in all categories during the winter and spring. SE winds occur in the flow to the rear of eastward moving highs and in developing lows or the lee-side trough of the Rockies. June shows the highest frequency of occurrence of winds from S-SE and also the highest frequency of occurrence of winds above 10 knots from these directions.

PERCENT OCCURRENCE  
of  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)

JANUARY

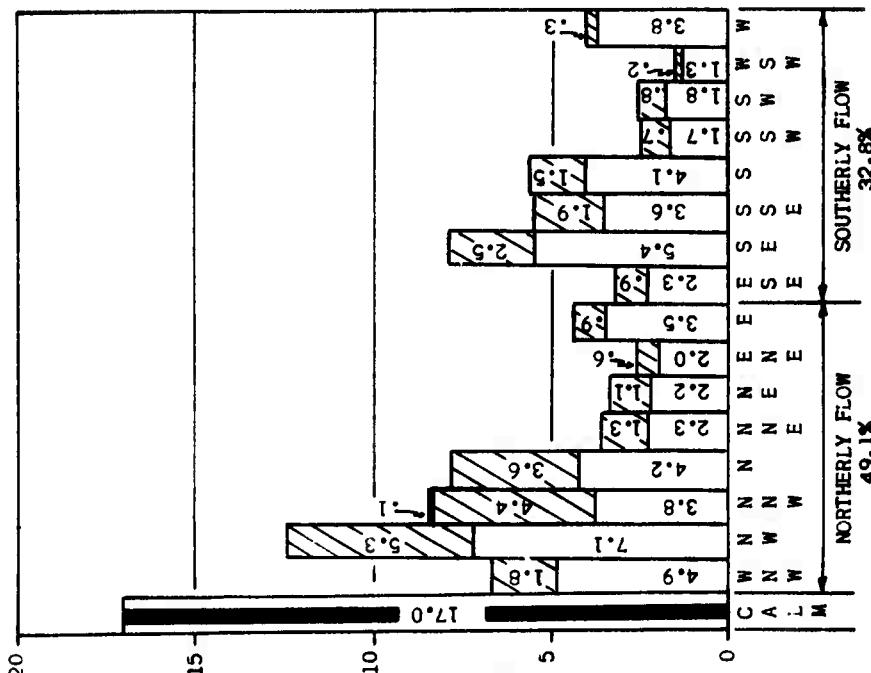
27+ kts.  
11-27 kts.  
1-10 kts.  
Calm



PERCENT OCCURRENCE  
of  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)

FEBRUARY

27+kts  
11-27kts  
1-10kts  
Calm



PERCENT

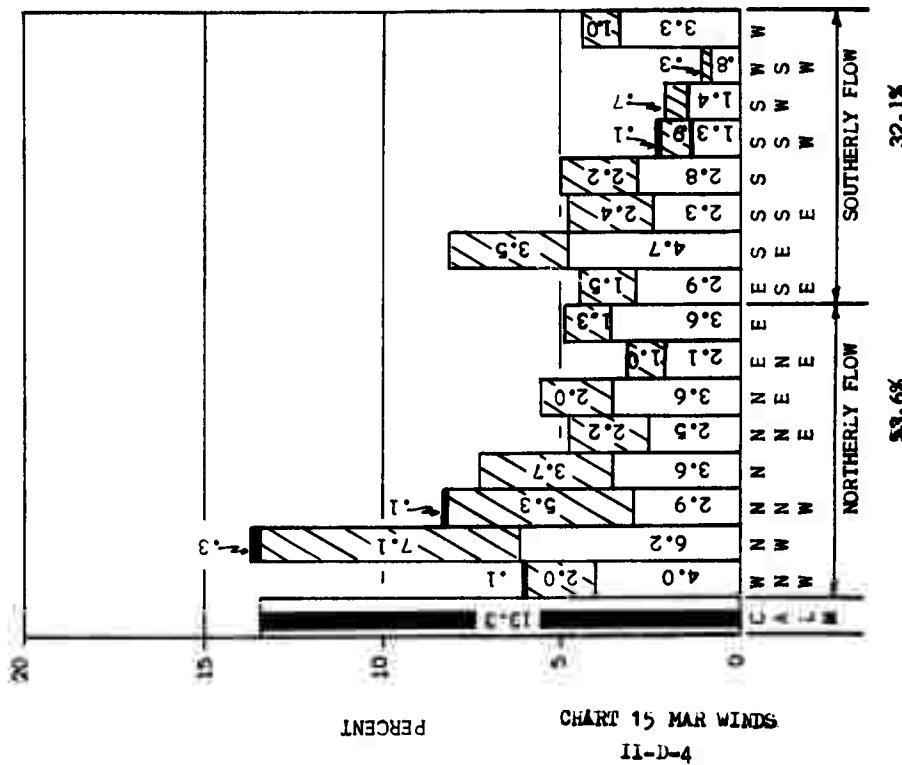
CHART 14 FEB WINDS

3-1-77

PERCENT OCCURRENCE  
of  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)

MARCH

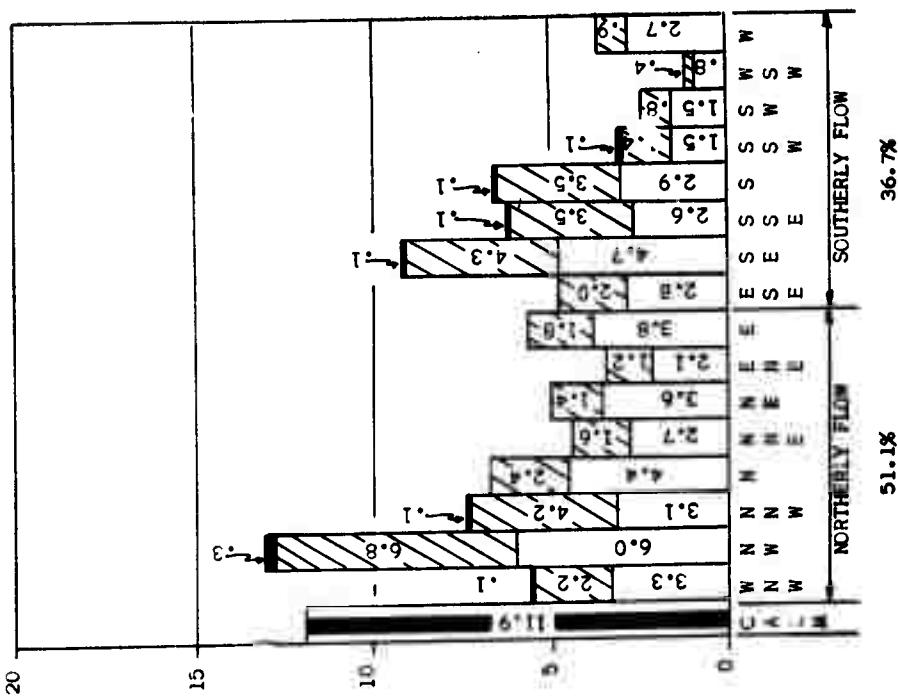
27kts  
11-27kts  
1-10kts  
Calm



20

### PERCENT OCCURRENCE OF VELOCITY & DIRECTION (Jan 48-Sept 67)

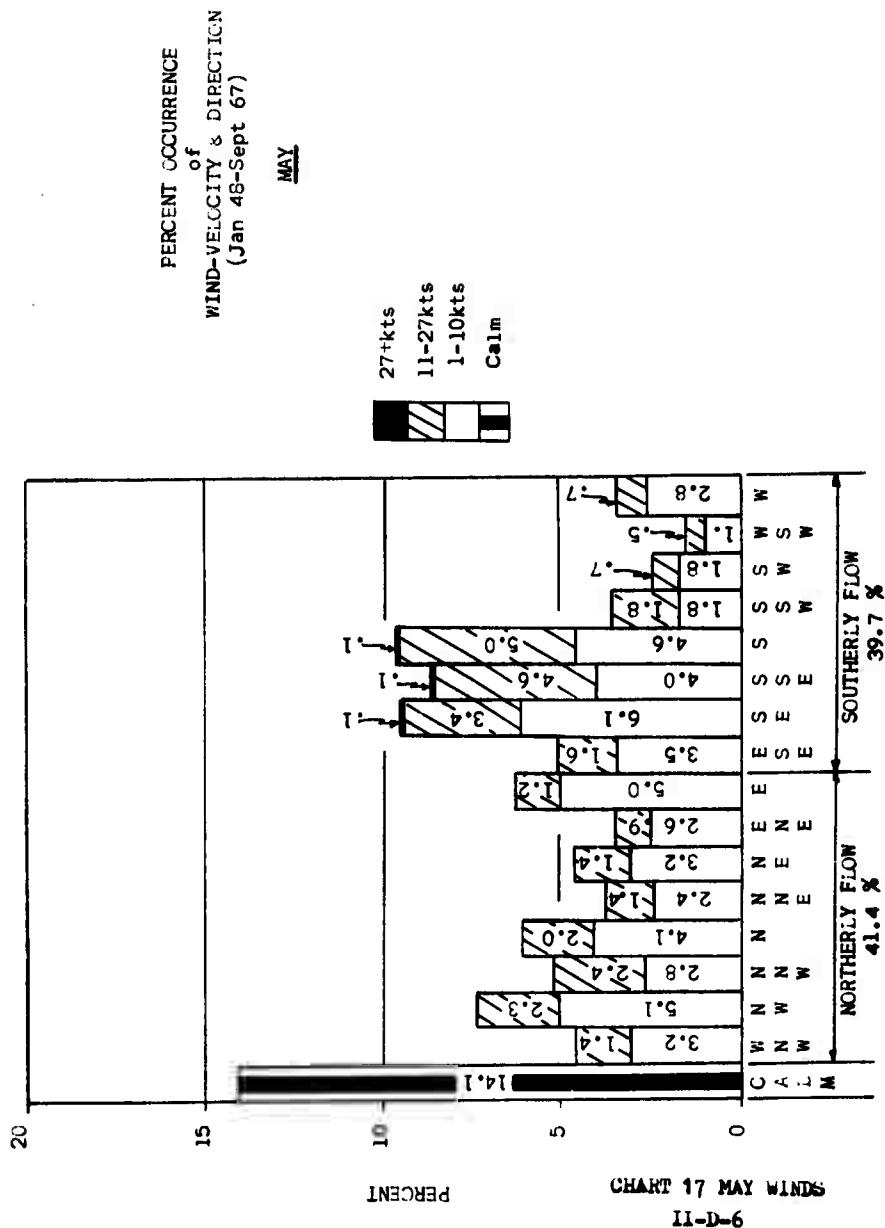
APRIL



### PERCENT

CHART 16 APR WINDS

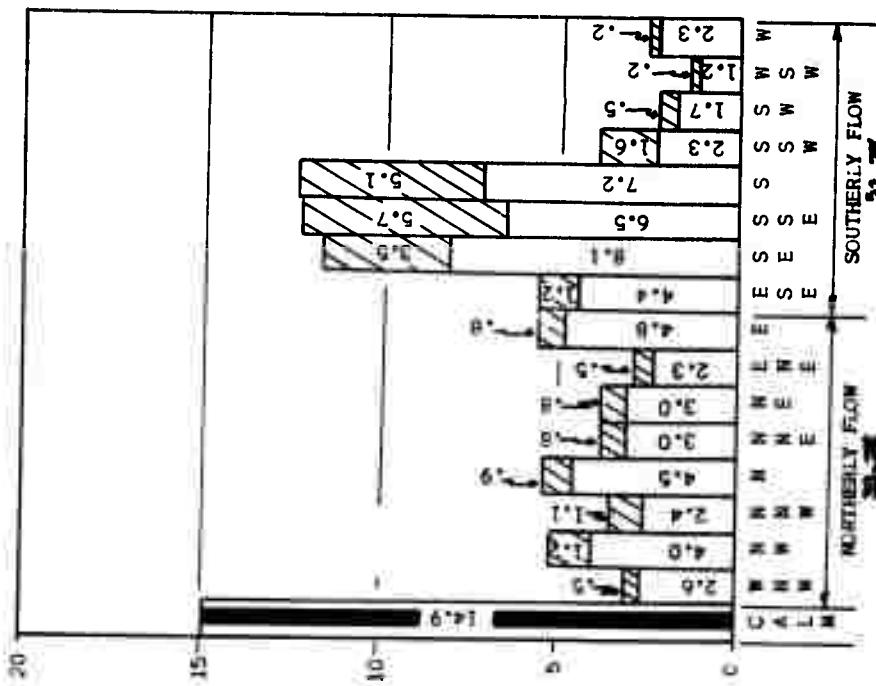
II-D-5



PERCENT OCCURRENCE  
of  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)

JUNE

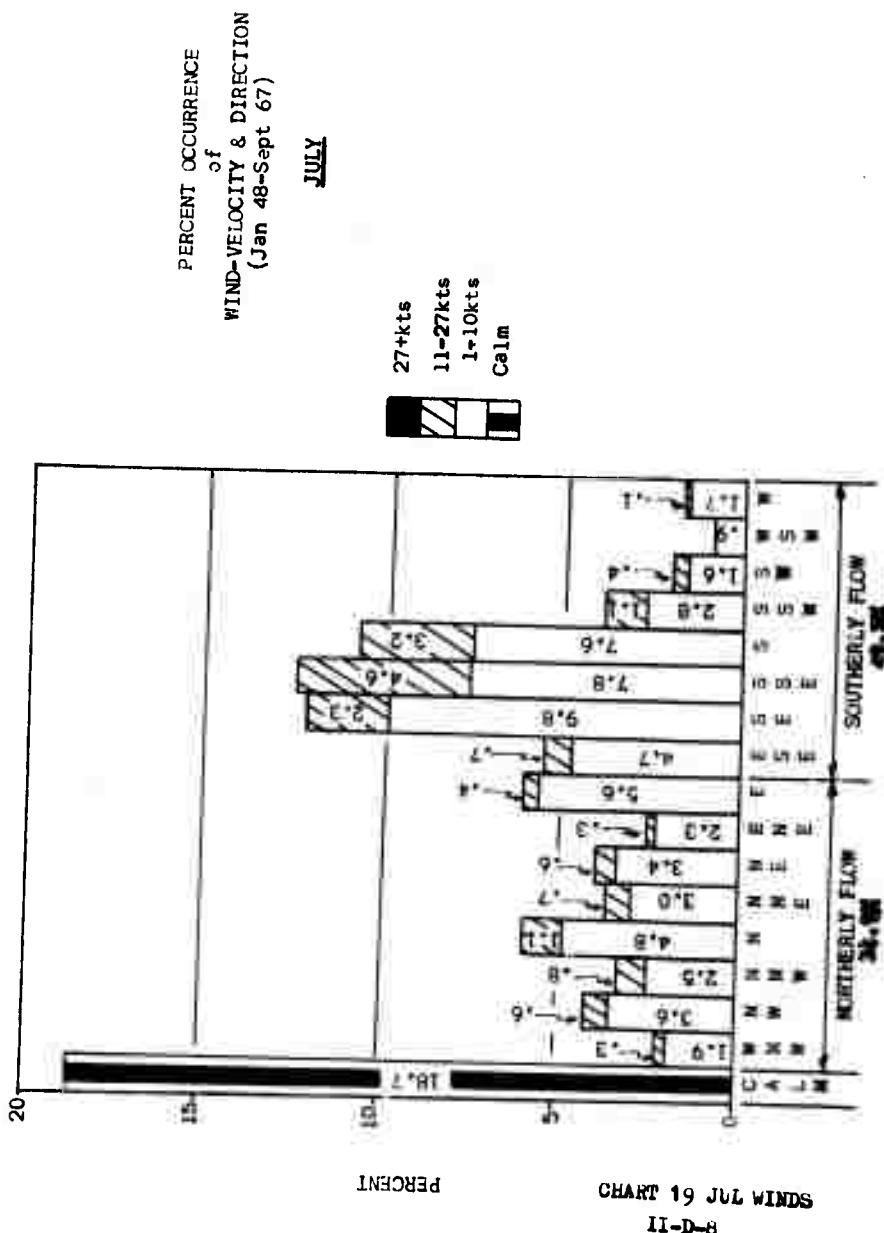
27+kts  
11-27kts  
1-10kts  
Calm



PERCENT

CHART 18 JUN WINDS

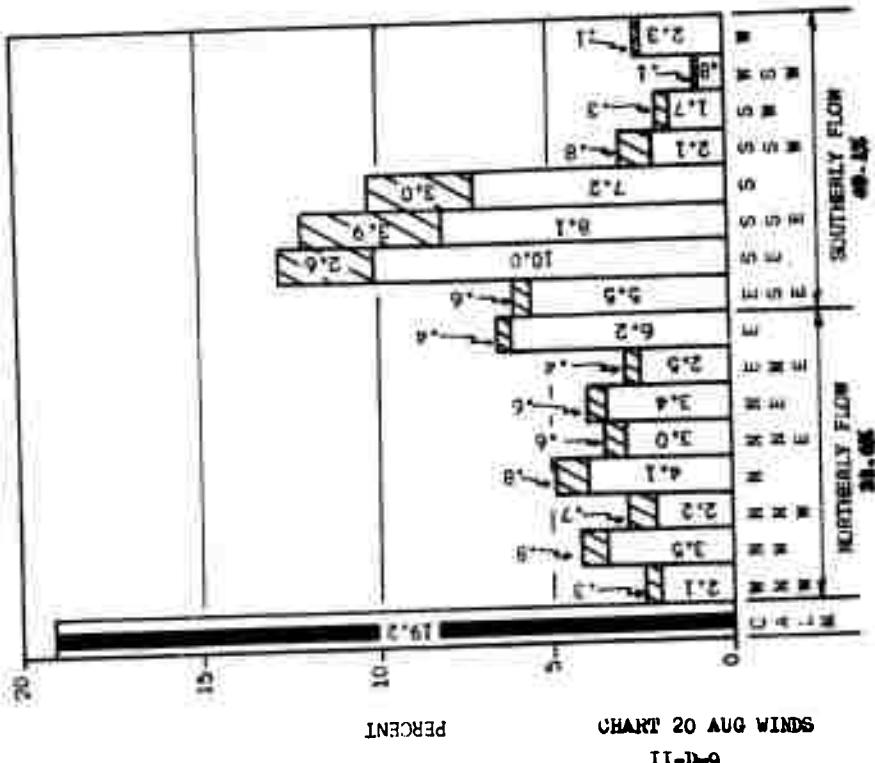
7-D-11



PERCENT OCCURRENCE  
of  
WIND VELOCITY & DIRECTION  
(Jan 48-Sept 67)

AUGUST

27+kts  
11-27kts  
1-10kts  
Calm



PERCENT OCCURRENCE  
of  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)

SEPTEMBER

27+kts  
11-27kts  
1-10kts  
Calm

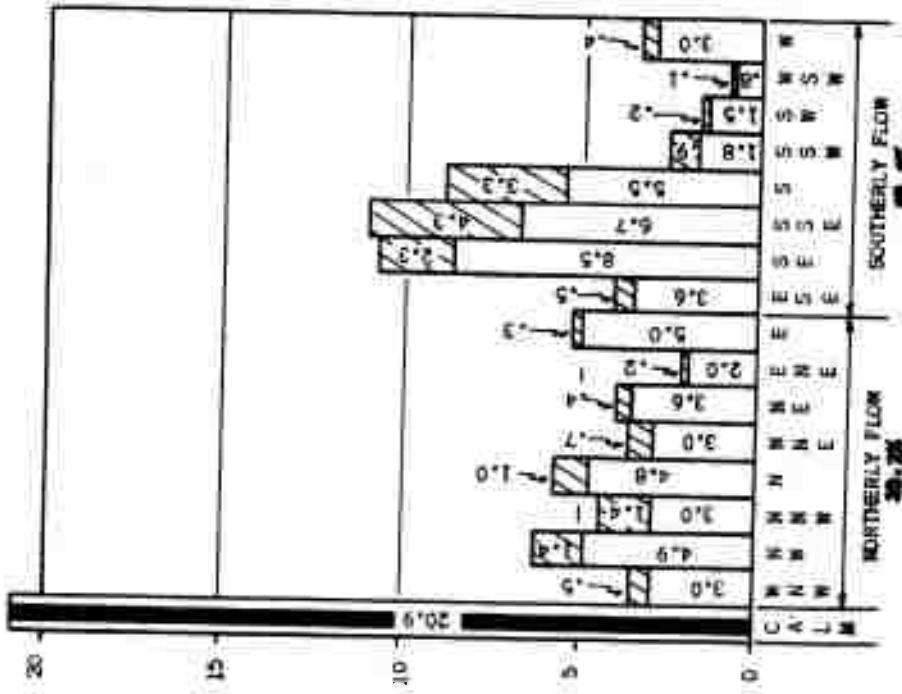


CHART 21 SEP WINDS  
II-D-10

20

15

P. ERGENI

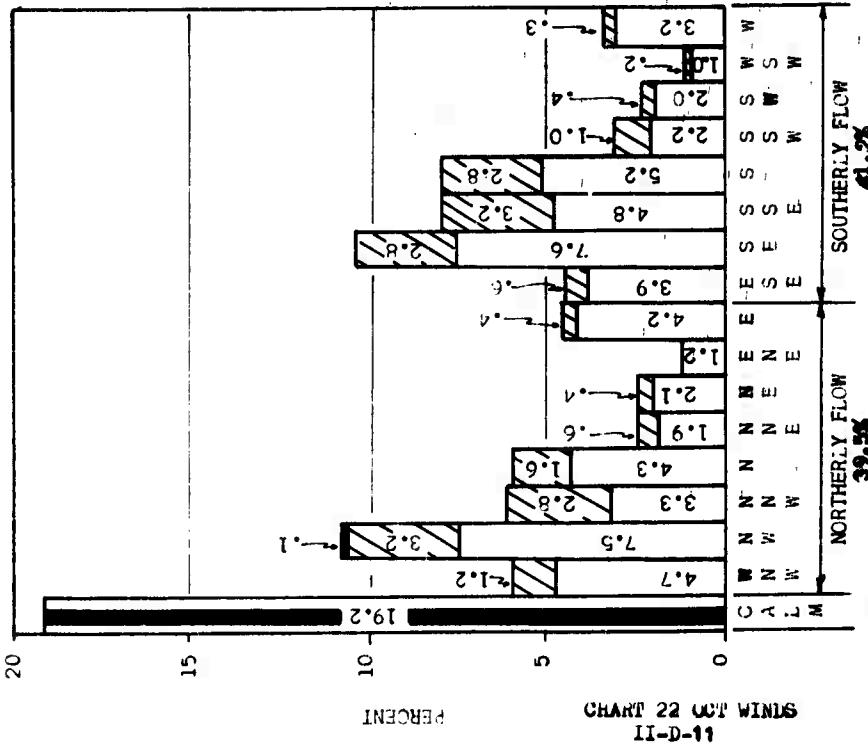
CHART 22 OCT WINIS

II-D-19

**PERCENT OCCURRENCE  
OF  
WIND-VELOCITY & DIRECTION  
(Jan 48-Sept 67)**

OCTOBER

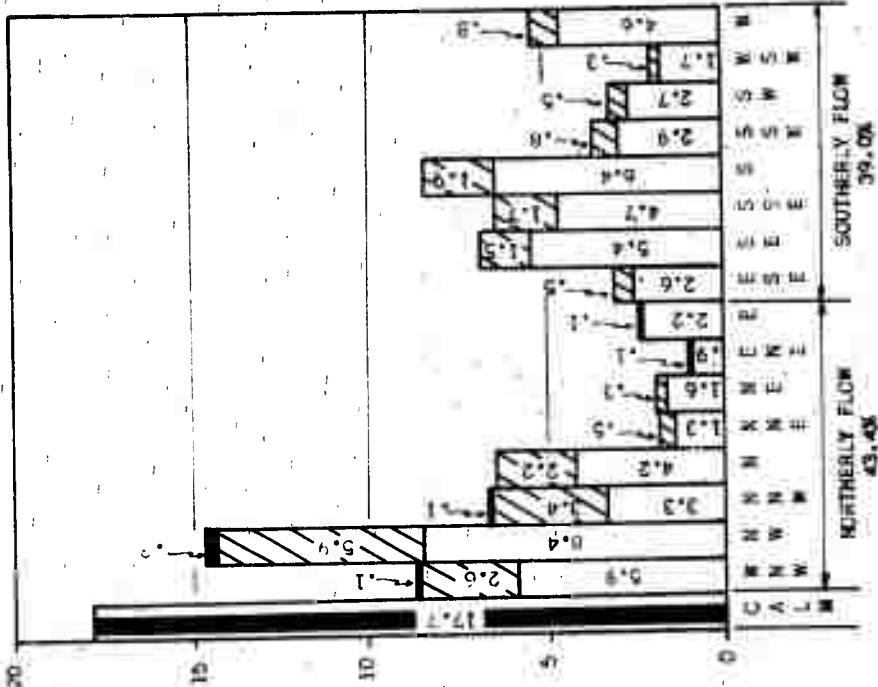
27+ kts  
11-27 kts  
1-10 kts  
Calm

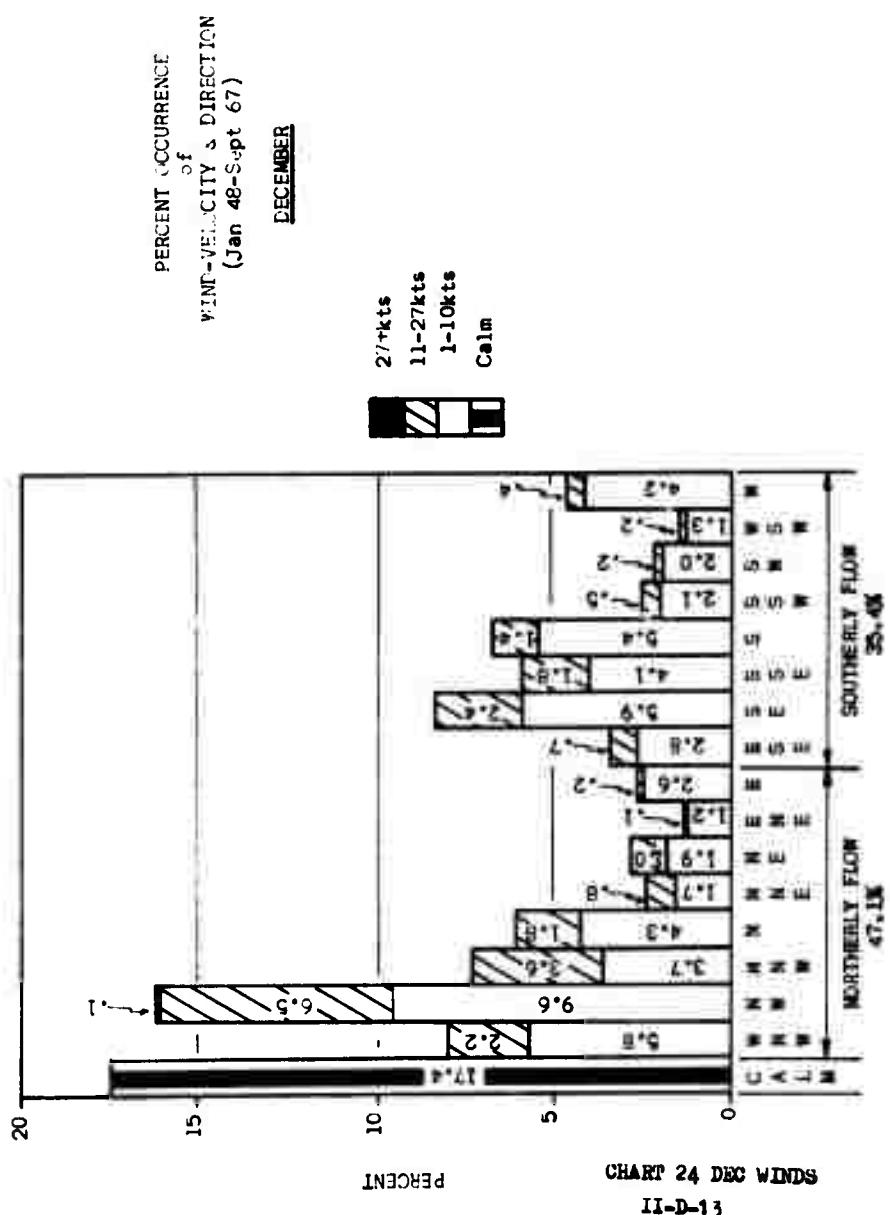


PERCENT OCCURRENCE  
- of -  
WIND VELOCITY & DIRECTION  
(Jan 48-Sept 67)

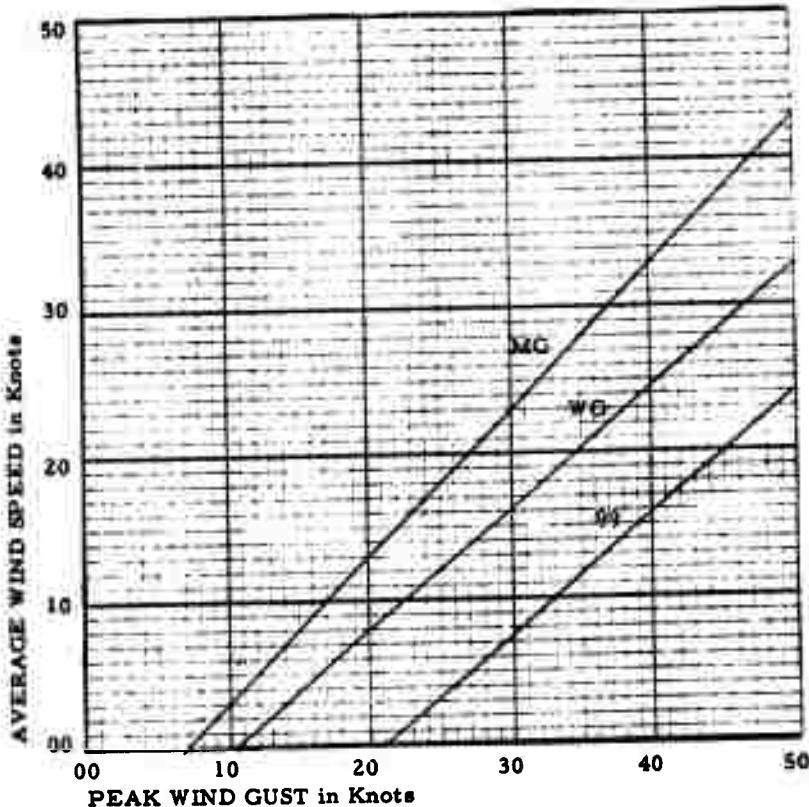
NOVEMBER

27+kts  
11-27kts  
1-10kts  
Calm





OFFUTT AFB, NE



Nomogram relating average wind speed to peak wind gust in knots.

WG = Weighted mean gust, MG = Minimum gust, 99 = 99% of peak wind gusts will be less than that indicated by the regression line.

$$WG = 1.2 \text{ (Mean Wind Speed)} + 10.5$$

$$MG = \text{(Mean Wind Speed)} + 7$$

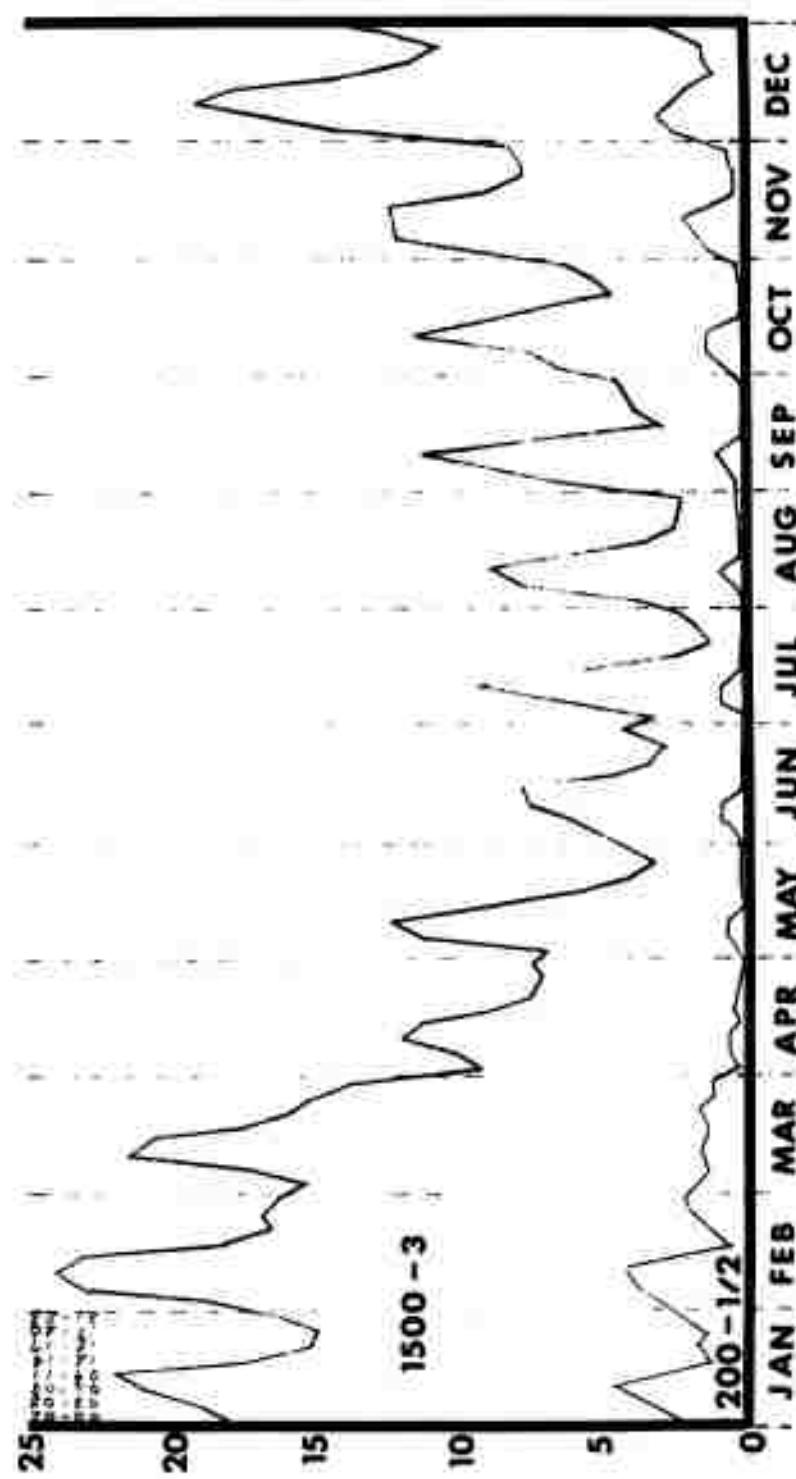
$$99\% \text{ of gusts will be less than: } 1.2 \text{ (Mean Wind Speed)} + 21$$

Period of Record: 1 January 1952 through 30 April 1967

## SECTION E FLYING WEATHER

The accompanying chart depicts the overall flying weather observed at Offutt AFB. The ordinate is in percent frequency of occurrence and the abscissa is 3 hourly time blocks by month. The area enclosed by the upper line is the percent of time the hourly observation is less than 1500 feet and/or 3 miles while the lower line represents 200 feet and/or  $\frac{1}{2}$  mile. For a more detailed summary refer to Part D of the Revised Uniform Summary of Surface Weather Observations for Offutt AFB.

## ANNUAL FLYING WEATHER



NOV DEC  
OCT SEP AUG JUL MAY APR MAR FEB JAN  
200-1/2  
1500-3

#### SECTION F EQUIVALENT CHILL

During the winter season the combined effects of wind speed and free air temperature result in an effective sensible temperature which is considerably lower than that recorded on the Offutt observations. Certain protective measures are taken by base agencies when the Equivalent Chill Temperature exceeds certain critical values. Three charts are provided to acquaint the newly assigned forecaster with those periods when base agencies will be interested in Equivalent Chill Temperature and they are: (1) Chart used to obtain the numerical value for Equivalent Chill Temperature; (2) the monthly average occurrence for below  $-20^{\circ}\text{F}$  and  $-40^{\circ}\text{F}$ ; and (3) the diurnal variation for these two selected values during the worst month of January.

WIND SPEED		COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																					
KNOTS	MPH	TEMPERATURE (°F)																					
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60	
EQUIVALENT CHILL TEMPERATURE																							
3 - 6	5	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-65	-70	
7 - 10	10	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75	-80	-85	-90	-95
11 - 15	15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	-95	-100	-105	-110	-115
16 - 19	20	20	10	5	0	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100	-110	-115	-120	-125
20 - 23	25	15	10	0	-5	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-105	-110	-120	-125	-135	-140
24 - 28	30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	-115	-125	-130	-140	-145
29 - 32	35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-70	-75	-80	-90	-100	-105	-115	-120	-130	-135	-145
33 - 36	40	10	0	-5	-15	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125	-130	-140	-150	-155
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT.		LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 min.)					GREAT DANGER (Flesh may freeze within 30 seconds)											
DANGER OF FREEZING EXPOSED FLESH FOR PROPERLY CLOTHED PERSONS																							

#### INSTRUCTIONS

MEASURE LOCAL TEMPERATURE AND WIND SPEED IF POSSIBLE; IF NOT, ESTIMATE. ENTER TABLE AT CLOSEST 5° F INTERVAL ALONG THE TOP AND WITH APPROPRIATE WIND SPEED ALONG LEFT SIDE. INTERSECTION GIVES APPROXIMATE EQUIVALENT CHILL TEMPERATURE; THAT IS, THE TEMPERATURE THAT WOULD CAUSE THE SAME RATE OF COOLING UNDER CALM CONDITIONS.

#### NOTES

##### WIND

1. THIS TABLE WAS CONSTRUCTED USING MILES PER HOUR (MPH), HOWEVER, A SCALE GIVING THE EQUIVALENT RANGE IN KNOTS HAS BEEN INCLUDED ON THE CHART TO FACILITATE ITS USE WITH EITHER UNIT.
2. WIND MAY BE CALM BUT FREEZING DANGER GREAT IF PERSON IS EXPOSED IN MOVING VEHICLE, UNDER HELICOPTER ROTORS, IN PROPELLOR BLAST, ETC. IT IS THE RATE OF RELATIVE AIR MOVEMENT THAT COUNTS AND THE COOLING EFFECT IS THE SAME WHETHER YOU ARE MOVING THROUGH THE AIR OR IT IS BLOWING PAST YOU.
3. EFFECT OF WIND WILL BE LESS IF PERSON HAS EVEN SLIGHT PROTECTION FOR EXPOSED PARTS - LIGHT GLOVES ON HANDS, PARKA HOOD SHIELDING FACE, ETC.

##### ACTIVITY

DANGER IS LESS IF SUBJECT IS ACTIVE. A MAN PRODUCES ABOUT 100 WATTS (341 BTU's) OF HEAT STANDING STILL BUT UP TO 1000 WATTS (3413 BTU's) IN VIGOROUS ACTIVITY LIKE CROSS-COUNTRY SKIING.

##### PROPER USE OF CLOTHING and ADEQUATE DIET

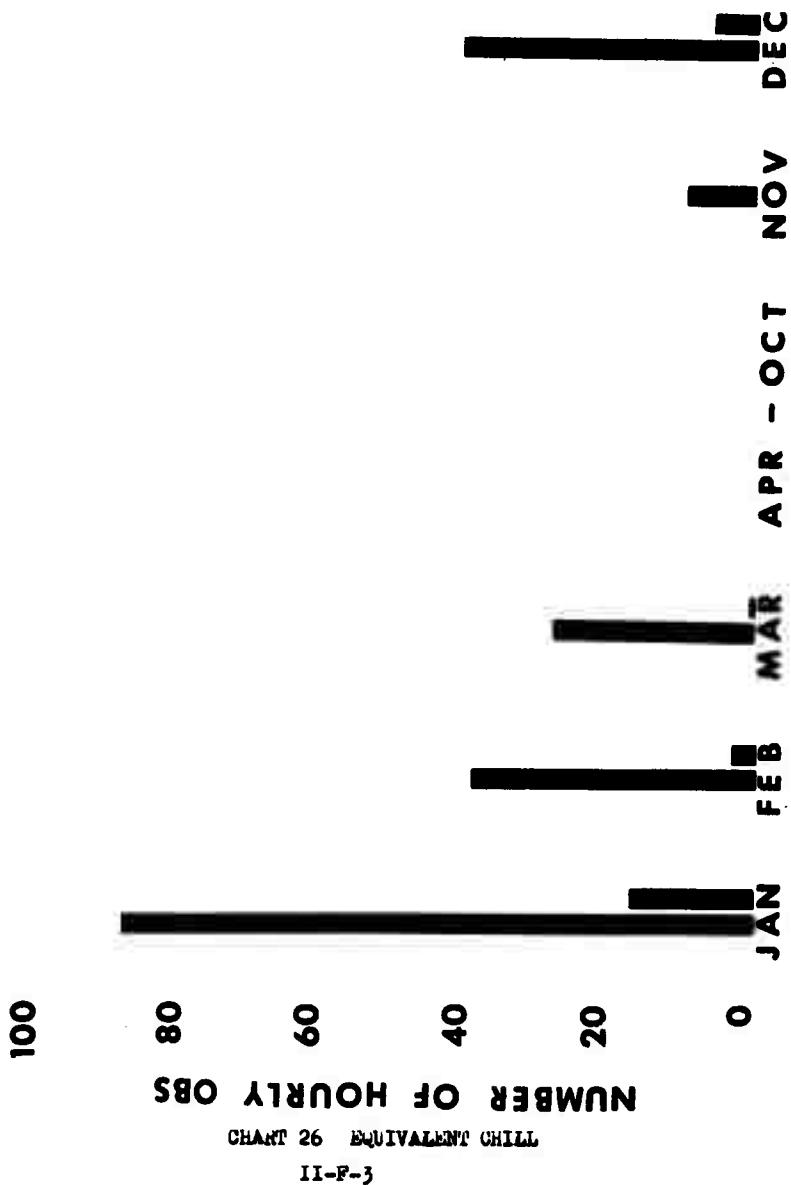
are both important.

##### COMMON SENSE

THERE IS NO SUBSTITUTE FOR IT. THE TABLE SERVES ONLY AS A GUIDE TO THE COOLING EFFECT OF THE WIND ON BARE FLESH WHEN THE PERSON IS FIRST EXPOSED. GENERAL BODY COOLING AND MANY OTHER FACTORS AFFECT THE RISK OF FREEZING INJURY.

This chart is adapted from NTP 161-1-11

**EQUIVALENT CHILL TEMPERATURE  
AVERAGE NUMBER OF OBS  
LESS THAN -20 F AND -40 F**



# JAN EQUIVALENT CHILL TEMP

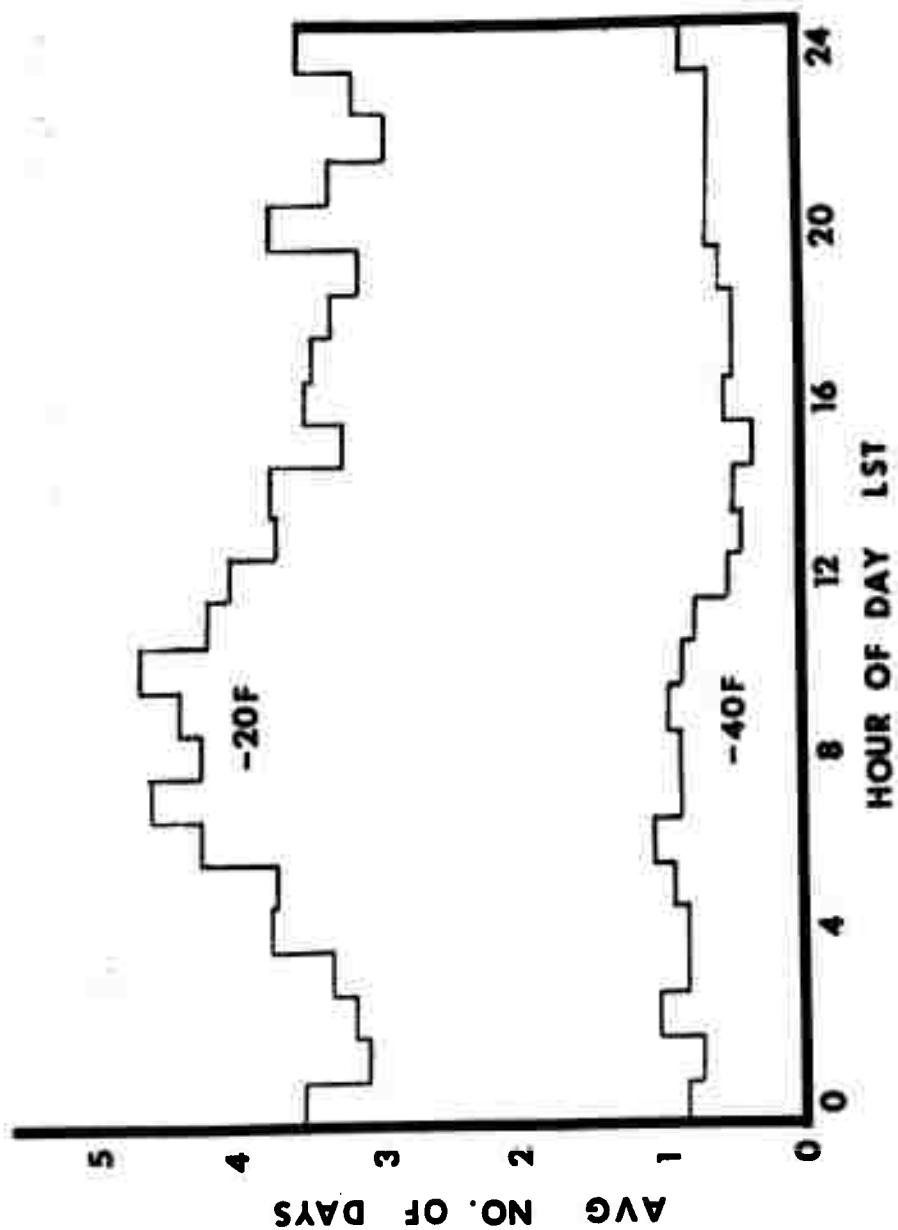


CHART 27 JAN EQUIV CHILL

II-F-4

## MEAN STATION PRESSURE AND DEPARTURE FROM MEAN TABLES AND GRAPHS

The tables and graphs for mean station pressure and departure from the mean for Offutt AFB, NE, were compiled from hourly data from 1 January 1951 through 31 December 1958 and from three hourly data from 1 January 1959 through 30 April 1967.

To make all hours compatible, an average value was determined for each hour for the first period of data; then an average was determined for each three hourly for the entire period. An average of the difference between these two figures for three hourly data was used for linear interpolation of the intermediate hourly values between the three hourly data.

Due to a different period of record than that used in the RUSSWO, the mean monthly pressure values in these tables in general are less. The largest difference is 0.02 in. Hg. for the month of February.

The mean station pressure curve, the previous 24-hour pressure curve and prognostic chart pressure values may be used to forecast pressure and altimeter values for the station.

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OFFUTT AFB N3.  
00 JAN

STATION	MEAN	DEPARTURE	STATION	MEAN	DEPARTURE		
001	28.956	06L	23.959	12L	28.967	13L	28.955
	0	-.004	0	-.003	0	-.007	
011	28.951	07L	23.963	13L	28.947	19L	28.963
	0	-.001	0	-.015	0	-.001	
02L	28.962	03L	28.971	14L	28.937	20L	28.967
	0	-.000	0	-.038	0	-.025	
03L	28.960	03L	28.980	15L	28.940	21L	28.970
	0	-.002	0	.018	0	-.022	
04L	26.958	10L	26.990	16L	26.943	22L	26.972
	0	-.005	0	.028	0	-.019	
05L	28.955	11L	28.997	17L	28.947	23L	28.972
	0	-.018	0	.025	0	-.015	

MONTHLY MEAN 28.962

PERIOD OF REPORT 1/1/51 - 3L/4/57  
 NUMBER OF OBSERVATIONS USED 7910  
 DATE PREPARED 26 JANUARY 1971

MSGT HFARN 5105 SOC 7VC FXT 1441 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN OF HOUR

FOR JAN

OFFUTT AFB AB. LOCAL STANDARD TIME  
50 01 12 03 04 05 26 07 06 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23

+015 INS.

+016 INS.

+017 INS.

+018 INS.

+019 INS.

+020 INS.

+021 INS.

+022 INS.

+023 INS.

+024 INS.

+025 INS.

+026 INS.

+027 INS.

+028 INS.

+029 INS.

+030 INS.

+031 INS.

+032 INS.

+033 INS.

II-G-3

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
FOR FEB

	1CL	M 28.912	C6L	M 28.915	12L	M 28.920	18L	M 28.925
	D .0004	D .004	D .015	D .013	D .013	D .015	D .015	D .015
01L	M 28.920	C7L	M 28.923	13L	M 28.932	19L	M 28.937	
D .005	D .008	D .019	D .028	D .033	D .033	D .036	D .036	
02L	M 28.912	C8L	M 28.934	14L	M 28.938	20L	M 28.940	
D .003	D .019	D .031	D .041	D .047	D .047	D .055	D .055	
03L	M 28.915	C9L	M 28.939	15L	M 28.935	21L	M 28.913	
D .000	D .023	D .030	D .023	D .020	D .020	D .022	D .022	
04L	M 28.912	1CL	M 28.943	16L	M 28.992	22L	M 28.916	
D .003	D .028	D .028	D .028	D .034	D .034	D .031	D .031	
05L	M 28.914	11L	M 28.963	17L	M 28.934	23L	M 28.913	
D .001	D .028	D .028	D .021	D .021	D .022	D .022	D .022	

MONTHLY MEAN 28.915

PERIOD OF REPORT 1/ 1/51 - 3C/ 4/67  
NUMBER OF OBSERVATIONS USED 7220  
DATE PREPARED 26 JANUARY 1971

MSGT HEDDN 1105 500 1VC EXIT 1441 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FCF FEF

OFFUTT AFB NB.

LOCAL STANDARD TIME

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23

\* 15 INS.

\* 29 INS.

\* 32 INS.

\* 37 INS.

\* 36 INS.

\* 05 INS.

\* 05 INS.

\* 04 INS.

\* 03 INS.

\* 02 INS.

\* 01 INS.

\* 00 INS.

\* 01 INS.

\* 02 INS.

\* 03 INS.

\* 04 INS.

\* 05 INS.

\* 06 INS.

\* 07 INS.

\* 08 INS.

\* 09 INS.

\* 10 INS.

\* 11 INS.

\* 12 INS.

\* 13 INS.

II-G-5

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OFFUTT AFÉ NB.  
FCG PA.

C0L	M	28.855	C0L	M	28.862	12L	M	28.858	18L	M	28.877
C	D	.008	D	D	.012	D	D	.007	D	D	-.023
C1L	M	28.860	C7L	M	28.866	13L	M	28.844	19L	M	28.834
C	C	.010	D	D	.018	D	D	-.006	D	D	-.016
C2L	M	28.859	C8L	M	28.875	14L	M	28.828	20L	M	28.842
C	D	.009	D	D	.023	D	D	-.022	D	D	-.008
C3L	M	28.856	07L	M	28.875	15L	M	28.824	21L	M	28.843
C	D	.005	D	D	.025	D	D	-.027	D	D	-.001
C4L	M	28.852	10L	M	28.877	16L	M	28.819	22L	M	28.855
C	D	.012	D	D	.027	D	D	-.032	D	D	-.005
C5L	M	28.856	11L	M	28.871	17L	M	28.820	23L	M	28.857
C	D	.006	D	D	.021	D	D	-.031	D	D	-.007
MONTHLY MEAN											
28.850											

PERIOD OF REPORT 1/1/51 - 30/4/57  
NUMBER OF OBSERVATIONS USED 7853  
DATE PREPARED 26 JANUARY 1971

MSR1 MEAN PRESSURE 2401 UTC 2401 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FDP MAP

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR  
LOCAL STANDARD TIME  
OFFUTT AFB INS.  
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23

•••C1 INS.

•••C4 INS.

•••C7 INS.

•••C6 INS.

•••C5 INS.

•••C4 INS.

•••C3 INS.

•••C2 INS.

•••C1 INS.

•••C0 INS.

•••C9 INS.

•••C8 INS.

•••C7 INS.

•••C6 INS.

•••C5 INS.

•••C4 INS.

•••C3 INS.

•••C2 INS.

•••C1 INS.

•••C0 INS.

•••C7 INS.

•••C8 INS.

29.85

II-G-7

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OFFUTT AFB NE  
FOR APR

	M	28.314	001	M	28.615	121	M	28.514	161	M	28.772
PCL	D	-0.003	D	-0.014	D	-0.014	D	-0.013	D	-0.029	
01L	M	28.234	07L	M	28.325	13L	M	28.691	19L	M	28.775
	E	-0.004	D	-0.025	D	-0.025	D	-0.021	D	-0.025	
02L	M	28.650	08L	M	28.625	14L	M	28.728	20L	M	28.787
	D	-0.001	D	-0.028	D	-0.028	D	-0.013	D	-0.014	
03L	M	28.600	09L	M	28.930	15L	M	28.779	21L	M	28.795
	E	-0.001	D	-0.025	D	-0.025	D	-0.022	D	-0.026	
04L	M	28.600	10L	M	28.871	16L	M	28.769	22L	M	28.872
	D	-0.001	D	-0.031	D	-0.031	D	-0.021	D	-0.022	
05L	M	29.305	11L	M	29.526	17L	M	29.758	23L	M	28.674
	D	-0.004	D	-0.025	D	-0.025	D	-0.022	D	-0.022	

II-G-8

NOT REPRODUCIBLE

MONTHLY MEAN 28.651

PERIOD OF REPORT 1/1/51 - 30/4/77  
NUMBER OF OBSERVATIONS USED 7676  
DATE PREPARED 26 JANUARY 1971



MEAN STATION PRESSURE OFFUTT AFB, NE.  
FCF MAY

01L	M 26.851	06L	M 26.821	12L	M 28.512	18L	M 26.756
D	•.001	D	•.020	D	•.012	D	•.031
01L	M 28.852	07L	M 28.531	13L	M 28.800	19L	M 28.759
D	•.002	D	•.031	D	•.005	D	•.031
02L	M 28.851	08L	M 28.871	14L	M 28.732	20L	M 28.776
D	•.002	D	•.021	D	•.009	D	•.024
03L	M 28.852	09L	M 28.825	15L	M 28.782	21L	M 28.767
D	•.002	D	•.029	D	•.018	D	•.013
04L	M 28.854	10L	M 28.878	16L	M 28.773	22L	M 28.737
D	•.004	D	•.026	D	•.027	D	•.033
05L	M 28.850	11L	M 28.824	17L	M 28.765	23L	M 28.650
D	•.010	D	•.024	D	•.032	D	•.000

MONTHLY MEAN 28.800

PERIOD OF REPORT 1/ 1/61 - 3G/ 4/67  
NUMBER OF OBSERVATIONS USED 76E8  
DATE PREPARED 26 JANUARY 1971

NOT REPRODUCIBLE

MSRT WIRELESS SGT 2WC EXT 444 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
0010 INS.	••••• INS.
0019 INS.	••••• INS.
0028 INS.	••••• INS.
0037 INS.	••••• INS.
0046 INS.	••••• INS.
0055 INS.	••••• INS.
0064 INS.	••••• INS.
0073 INS.	••••• INS.
0082 INS.	••••• INS.
0091 INS.	••••• INS.
2903G EC INS.	••••• INS.
-0102 INS.	••••• INS.
-0111 INS.	••••• INS.
-0120 INS.	••••• INS.
-0129 INS.	••••• INS.
-0138 INS.	••••• INS.
-0147 INS.	••••• INS.
-0156 INS.	••••• INS.
-0165 INS.	••••• INS.
-0174 INS.	••••• INS.
-0183 INS.	••••• INS.
-0192 INS.	••••• INS.
-0201 INS.	••••• INS.
-0210 INS.	••••• INS.
-0219 INS.	••••• INS.
-0228 INS.	••••• INS.
-0237 INS.	••••• INS.
-0246 INS.	••••• INS.
-0255 INS.	••••• INS.
-0264 INS.	••••• INS.
-0273 INS.	••••• INS.
-0282 INS.	••••• INS.
-0291 INS.	••••• INS.
-0300 INS.	••••• INS.
-0309 INS.	••••• INS.
-0318 INS.	••••• INS.
-0327 INS.	••••• INS.
-0336 INS.	••••• INS.
-0345 INS.	••••• INS.
-0354 INS.	••••• INS.
-0363 INS.	••••• INS.
-0372 INS.	••••• INS.
-0381 INS.	••••• INS.
-0390 INS.	••••• INS.
-0399 INS.	••••• INS.

II-G-11

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OFFUTT AIR FORCE BASE  
FOR JUN

			MEAN	DEPARTURE	MEAN	DEPARTURE	MEAN	DEPARTURE
C1L	M 28.735	DEL	M 28.304	12L	M 28.300	13L	M 28.749	
C	-0.020	D	-0.015		C -0.016		D -0.026	
01L	M 28.768	07L	M 28.813	13L	M 28.789	19L	M 28.767	
D	-0.003	D	-0.029		S -0.005		D -0.038	
02L	M 28.786	08L	M 28.817	14L	M 28.778	25L	M 28.753	
D	-0.002	D	-0.033		D -0.006		D -0.071	
C3L	M 28.768	09L	M 28.816	15L	M 28.769	21L	M 28.765	
D	-0.004	D	-0.021		D -0.015		D -0.019	
C4L	M 28.790	10L	M 28.814	16L	M 28.760	22L	M 28.777	
C	-0.006	D	-0.030		D -0.025		D -0.071	
C5L	M 28.795	11L	M 28.811	17L	M 28.751	23L	M 28.782	
D	-0.010	D	-0.026		D -0.033		D -0.033	

MONTHLY MEAN 28.784

PERIOD OF REPORT 1/ 1/51 - 30/ 4/67  
NUMBER OF OBSERVATIONS USED 7440  
DATE PREPARED 26 JANUARY 1971

NSC/T MELTON 41105 1000 7-25 1971 441 UNCLASSIFIED

DATE 012671

DEPARTURE OF CITATION FIGHTER FROM MEAN FREE FLOW

OFFFLY AFB KB\* F9F JUN 1967 LOCAL STANDARD TIME

OFFFLY	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23																							
*01C INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*02C INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*03C 7 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*04C 6 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*05C 5 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*06C 4 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*07C 2 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
*08C 1 INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23.78	00	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-001	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-002	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-003	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-004	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-005	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-006	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-007	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-008	INS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

II-G-13

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OCT JUL

00L	M 28.675	06L	M 26.654	12L	M 28.256	18L	M 28.803
01L	M 28.636	07L	M 26.664	13L	M 28.343	19L	M 28.801
02L	M 28.634	08L	M 26.685	14L	M 28.834	20L	M 28.806
03L	M 28.637	09L	M 28.670	15L	M 28.624	21L	M 28.817
04L	M 28.639	10L	M 28.870	16L	M 28.815	22L	M 28.826
05L	M 28.644	11L	M 23.356	17L	M 28.336	23L	M 28.833

MONTHLY MEAN 28.636

PERIOD OF REPORT 1/ 1/51 - 3L/ 4/67  
NUMBER OF OBSERVATIONS USED 7264  
DATE PREPARED 26 JANUARY 1971

H-G-14

45RT 4540N 110G 50G 3VC EXT 441 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FOR JULY

OFFUTT AF B 18.  
St C1 .2 .3 .4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23

♦.10 INS.

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♦.13 INS.

II-G-15

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
FOR AUC

OFFUTT AFB NO.

1CL	M 28.837	C6L	M 26.855	12L	M 28.859	19L	M 28.876
D	-.003	D	-.016	D	-.019	D	-.031
C1L	M 28.833	C7L	M 28.866	13L	M 28.847	19L	M 29.833
D	-.011	D	-.026	D	-.028	D	-.037
D2L	M 28.878	C8L	M 28.869	14L	M 28.837	2CL	M 28.812
D	-.002	D	-.030	D	-.003	D	-.028
03L	M 28.840	C9L	M 28.871	15L	M 28.826	21L	M 29.821
C	-.000	D	-.032	D	-.013	D	-.016
C4L	M 28.841	1CL	M 28.874	16L	M 28.816	22L	M 28.830
D	-.002	D	-.034	D	-.024	D	-.029
05L	M 28.846	11L	M 28.870	17L	M 28.814	23L	M 28.835
D	-.007	D	-.030	D	-.026	D	-.024

MONTHLY MEAN 28.840

PERIOD OF REPORT 1/1/51 - 3C/4/67  
NUMBER OF OBSERVATIONS USED 7316  
DATE PREPARED 26 JANUARY 1971

MSGT MELVIN H. COLE 2000 UNCLASSIFIED

DATE 012671

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FCF AUC

LOCAL STANDARD TIME

OFFUTT AF3 HRS.

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
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♦♦07	INS.																							
♦♦06	INS.																							
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♦♦03	INS.																							
♦♦02	INS.																							
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H-G-17

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
OFFUTT AFB NE.  
FOR SEP

C01	M 28.007	EFL	M 28.089	12L	M 28.086	18L	M 28.079
	D -0.014		D .016		D .015		D -0.032
C11	M 28.060	C7L	M 28.098	13L	M 28.071	19L	M 28.039
	D -0.015		D -0.027		D -0.000		D -0.032
C2L	M 28.071	G8L	M 28.073	14L	M 28.059	25L	M 28.052
	D .001		D .032		D -.011		D -0.019
C3L	M 28.073	G3L	M 28.055	15L	M 28.048	21L	M 28.056
	D .002		D .035		D -.023		D -0.013
C4L	M 28.074	I6L	M 28.066	16L	M 28.037	22L	M 28.065
	D .004		D .037		D -.034		D -0.006
C5L	M 28.085	I1L	M 28.002	17L	M 28.039	23L	M 28.067
	D .009		D .071		D -.032		D -0.014

MONTHLY MEAN 26.071

PERIOD OF REPORT 1/ 1/51 - 30/ 4/67  
NUMBER OF OBSERVATIONS USED 7072  
DATE PREPARED 26 JANUARY 1971



OFFUTT AFB NO.  
MEAN STATION DEVIATION AND DEPARTURE FROM MEAN  
FOR CCT

CCL	M 28.900	CFL	M 28.912	12L	M 28.909	1PL	M 28.873
D	0 .002	D	0 .014	C	0 .011	D	0 .025
01L	M 28.902	07L	M 28.919	13L	M 28.908	19L	M 28.821
C	0 .004	D	0 .021	D	0 .010	D	0 .017
C2L	M 28.901	CFL	M 28.925	14L	M 28.975	20L	M 28.837
D	0 .003	D	0 .031	D	0 .023	D	0 .011
C3L	M 28.901	09L	M 28.930	15L	M 28.970	21L	M 28.893
C	0 .003	D	0 .032	C	0 .028	D	0 .006
C4L	M 28.901	1CL	M 28.931	16L	M 28.865	22L	M 28.806
D	0 .002	D	0 .033	D	0 .033	D	0 .000
C5L	M 28.906	11L	M 28.930	17L	M 28.965	23L	M 28.899
C	0 .008	D	0 .032	D	0 .033	D	0 .001

MONTHLY MEAN 28.856

PERIOD OF REPORT 1/1/51 - 30/4/67  
NUMBER OF OBSERVATIONS USED 7291  
DATE PREPARED 26 JANUARY 1971

## DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

OFFUTT AFB NE  
01 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
♦ 15 INS.  
♦ 16 INS.  
♦ 17 INS.  
♦ 18 INS.  
♦ 19 INS.  
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♦ 44 INS.  
♦ 45 INS.  
♦ 46 INS.  
♦ 47 INS.  
♦ 48 INS.

2000C

II-G-21

MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
FOR NOV

00L	M 26.59	00L	M 26.514	12L	M 26.511	18L	M 26.500
01L	C 002	0	C 007	0	0.004	0	-0.017
01L	M 26.507	07L	M 26.518	13L	M 26.592	19L	M 26.533
02L	C 000	0	C 012	0	-0.014	0	-0.006
02L	M 26.509	08L	M 26.527	14L	M 26.576	20L	M 26.552
03L	C 002	0	C 020	0	-0.028	0	-0.004
03L	M 26.507	09L	M 26.531	15L	M 26.579	21L	M 26.506
04L	C 000	0	C 024	0	-0.028	0	-0.006
05L	M 26.505	10L	M 26.525	16L	M 26.579	22L	M 26.510
05L	C 001	0	C 028	0	-0.027	0	-0.004
05L	M 26.509	11L	M 26.529	17L	M 26.582	23L	M 26.511
05L	C 003	0	C 023	0	-0.025	0	-0.004

PERIOD OF REPORT 1/1/51 - 30/4/67  
NUMBER OF OBSERVATIONS USED 7090  
DATE PREPARED 26 JANUARY 1971  
MONTHLY MEAN 26.517

4557 MEAN 2005 500 745 FXT 441 UNCLASSIFIED

DATE 01267

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FCC NOV

OFFUTT AFM N.D. 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2100 2105 2110 2115 2120 2125 2130 2135 2140 2145 2150 2155 2200 2205 2210 2215 2220 2225 2230 2235 2240 2245 2250 2255 2300 2305 2310 2315 2320 2325 2330 2335 2340 2345 2350 2355 2400 2405 2410 2415 2420 2425 2430 2435 2440 2445 2450 2455 2500 2505 2510 2515 2520 2525 2530 2535 2540 2545 2550 2555 2600 2605 2610 2615 2620 2625 2630 2635 2640 2645 2650 2655 2700 2705 2710 2715 2720 2725 2730 2735 2740 2745 2750 2755 2800 2805 2810 2815 2820 2825 2830 2835 2840 2845 2850 2855 2900 2905 2910 2915 2920 2925 2930 2935 2940 2945 2950 2955 3000 3005 3010 3015 3020 3025 3030 3035 3040 3045 3050 3055 3100 3105 3110 3115 3120 3125 3130 3135 3140 3145 3150 3155 3200 3205 3210 3215 3220 3225 3230 3235 3240 3245 3250 3255 3300 3305 3310 3315 3320 3325 3330 3335 3340 3345 3350 3355 3400 3405 3410 3415 3420 3425 3430 3435 3440 3445 3450 3455 3500 3505 3510 3515 3520 3525 3530 3535 3540 3545 3550 3555 3600 3605 3610 3615 3620 3625 3630 3635 3640 3645 3650 3655 3700 3705 3710 3715 3720 3725 3730 3735 3740 3745 3750 3755 3800 3805 3810 3815 3820 3825 3830 3835 3840 3845 3850 3855 3900 3905 3910 3915 3920 3925 3930 3935 3940 3945 3950 3955 4000 4005 4010 4015 4020 4025 4030 4035 4040 4045 4050 4055 4100 4105 4110 4115 4120 4125 4130 4135 4140 4145 4150 4155 4200 4205 4210 4215 4220 4225 4230 4235 4240 4245 4250 4255 4300 4305 4310 4315 4320 4325 4330 4335 4340 4345 4350 4355 4400 4405 4410 4415 4420 4425 4430 4435 4440 4445 4450 4455 4500 4505 4510 4515 4520 4525 4530 4535 4540 4545 4550 4555 4600 4605 4610 4615 4620 4625 4630 4635 4640 4645 4650 4655 4700 4705 4710 4715 4720 4725 4730 4735 4740 4745 4750 4755 4800 4805 4810 4815 4820 4825 4830 4835 4840 4845 4850 4855 4900 4905 4910 4915 4920 4925 4930 4935 4940 4945 4950 4955 5000 5005 5010 5015 5020 5025 5030 5035 5040 5045 5050 5055 5100 5105 5110 5115 5120 5125 5130 5135 5140 5145 5150 5155 5200 5205 5210 5215 5220 5225 5230 5235 5240 5245 5250 5255 5300 5305 5310 5315 5320 5325 5330 5335 5340 5345 5350 5355 5400 5405 5410 5415 5420 5425 5430 5435 5440 5445 5450 5455 5500 5505 5510 5515 5520 5525 5530 5535 5540 5545 5550 5600 5605 5610 5615 5620 5625 5630 5635 5640 5645 5650 5655 5700 5705 5710 5715 5720 5725 5730 5735 5740 5745 5750 5755 5800 5805 5810 5815 5820 5825 5830 5835 5840 5845 5850 5855 5900 5905 5910 5915 5920 5925 5930 5935 5940 5945 5950 5955 6000 6005 6010 6015 6020 6025 6030 6035 6040 6045 6050 6055 6100 6105 6110 6115 6120 6125 6130 6135 6140 6145 6150 6155 6200 6205 6210 6215 6220 6225 6230 6235 6240 6245 6250 6255 6300 6305 6310 6315 6320 6325 6330 6335 6340 6345 6350 6355 6400 6405 6410 6415 6420 6425 6430 6435 6440 6445 6450 6455 6500 6505 6510 6515 6520 6525 6530 6535 6540 6545 6550 6600 6605 6610 6615 6620 6625 6630 6635 6640 6645 6650 6700 6705 6710 6715 6720 6725 6730 6735 6740 6745 6750 6755 6800 6805 6810 6815 6820 6825 6830 6835 6840 6845 6850 6855 6900 6905 6910 6915 6920 6925 6930 6935 6940 6945 6950 6955 7000 7005 7010 7015 7020 7025 7030 7035 7040 7045 7050 7055 7100 7105 7110 7115 7120 7125 7130 7135 7140 7145 7150 7155 7200 7205 7210 7215 7220 7225 7230 7235 7240 7245 7250 7255 7300 7305 7310 7315 7320 7325 7330 7335 7340 7345 7350 7355 7400 7405 7410 7415 7420 7425 7430 7435 7440 7445 7450 7455 7500 7505 7510 7515 7520 7525 7530 7535 7540 7545 7550 7600 7605 7610 7615 7620 7625 7630 7635 7640 7645 7650 7655 7700 7705 7710 7715 7720 7725 7730 7735 7740 7745 7750 7755 7800 7805 7810 7815 7820 7825 7830 7835 7840 7845 7850 7855 7900 7905 7910 7915 7920 7925 7930 7935 7940 7945 7950 7955 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8200 8205 8210 8215 8220 8225 8230 8235 8240 8245 8250 8255 8300 8305 8310 8315 8320 8325 8330 8335 8340 8345 8350 8355 8400 8405 8410 8415 8420 8425 8430 8435 8440 8445 8450 8455 8500 8505 8510 8515 8520 8525 8530 8535 8540 8545 8550 8600 8605 8610 8615 8620 8625 8630 8635 8640 8645 8650 8655 8700 8705 8710 8715 8720 8725 8730 8735 8740 8745 8750 8755 8800 8805 8810 8815 8820 8825 8830 8835 8840 8845 8850 8855 8900 8905 8910 8915 8920 8925 8930 8935 8940 8945 8950 8955 9000 9005 9010 9015 9020 9025 9030 9035 9040 9045 9050 9055 9100 9105 9110 9115 9120 9125 9130 9135 9140 9145 9150 9155 9200 9205 9210 9215 9220 9225 9230 9235 9240 9245 9250 9255 9300 9305 9310 9315 9320 9325 9330 9335 9340 9345 9350 9355 9400 9405 9410 9415 9420 9425 9430 9435 9440 9445 9450 9455 9500 9505 9510 9515 9520 9525 9530 9535 9540 9545 9550 9600 9605 9610 9615 9620 9625 9630 9635 9640 9645 9650 9655 9700 9705 9710 9715 9720 9725 9730 9735 9740 9745 9750 9755 9800 9805 9810 9815 9820 9825 9830 9835 9840 9845 9850 9855 9900 9905 9910 9915 9920 9925 9930 9935 9940 9945 9950 9955 9960 9965 9970 9975 9980 9985 9990 9995 9999

OFFUTT AFB No.  
MEAN STATION PRESSURE AND DEPARTURE FROM MEAN  
FOR DEC

00L	M 28.935	00L	M 28.926	12L	M 28.926	15L	M 28.919
D	-008	D	.001	D	.001	D	-.008
01L	M 28.932	07L	M 28.932	13L	M 28.933	19L	M 28.928
D	-.004	D	.005	D	-.010	D	-.001
02L	M 28.933	08L	M 28.938	14L	M 28.937	20L	M 28.931
D	.005	D	.010	D	-.030	D	.003
03L	M 28.930	09L	M 28.945	15L	M 28.931	21L	M 28.933
D	-.003	D	.016	D	-.027	D	.006
04L	M 28.926	10L	M 28.953	16L	M 28.934	22L	M 28.935
D	.000	D	.026	D	-.023	D	.008
05L	M 28.924	11L	M 28.947	17L	M 28.910	23L	M 28.938
D	-.003	D	.020	D	-.017	D	.011

MONTHLY MEAN 28.927

PERIOD OF REPORT 1/ 1/51 - 3C/ 4/67  
NUMBER OF OBSERVATIONS USED 7316  
DATE PREPARED 26 JANUARY 1971

NSC/T HEARN RING FDC TWC FXT 441 UNCLASSIFIED

DEPARTURE OF STATION PRESSURE FROM MEAN BY HOUR

FCF DEC

OFFUTT AFB AB.  
CL 01 12 13 14 15 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
0100 INS.

+0000 INS.

+0024 INS.

+0037 INS.

+0046 INS.

+0055 INS.

+0064 INS.

+0073 INS.

+0082 INS.

+0091 INS.

26.92

+0102 INS.

+0112 INS.

+0122 INS.

+0135 INS.

+0146 INS.

+0157 INS.

DATE 01267

II-G-25

PART III

WEATHER REGIMES

SECTION A	WINTER	III-A-1
SECTION B	SPRING	III-B-1
SECTION C	SUMMER	III-C-1
SECTION D	FALL	III-D-1

III-1

SECTION A - WINTER

Polar and arctic air masses dominate over Nebraska during winter. Flying weather deteriorates in low clouds, snow and fog as cyclonic storms and cold frontal weather move through the area normally alternating with generally fair, cold highs. Approximately 25% of the winter ceilings and visibilities fall below 3000  $\pm$  3 with 12% below 1000  $\pm$  2.

Cold fronts move south or southeast with the cold air boundary while remaining nearly stationary from the Nebraska panhandle northwest into Idaho. The cold front usually brings a narrow east-west band of clouds with strong north or northwest winds and good visibility except in occasional snowshowers.

Low systems which bring the worst weather are of two types. The first develops in the lee of the Rockies and moves southeast. The second, and often the more severe, develops and tracks east from Colorado. Fast moving storms and those which move north of Offutt normally do not cause very poor weather, while slower moving systems passing to the south can produce freezing precipitation and heavy snows as Gulf moisture becomes available. See Figure 1.

The severity of both storms is highly dependent upon the location and duration of the high pressure cell over the southeast U.S. which advects moisture-laden air from the Gulf up the Missouri River valley. The associated upper level trough contributes to the storm's intensity when it "digs" southward and

moves slowly eastward over the surface low and, with moisture present, develops a thick nimbostratus with heavy snowfalls just east of the trough.

Occasionally, the Nebraska area will experience snow under a continental high either from low level stratocumulus or from westerly flow over-running the cold dome. In the latter, cloud bases are usually above 3000ft. Stratocumulus with bases of one to three thousand feet often forms in the northwest flow behind cold fronts when winds in excess of twenty knots create sufficient turbulent mixing. The stratocumulus also tends to form one to three hours after sunrise and dissipate shortly after sunset. Most likely, heating or its cessation effects the stability of the boundary layer and hence, mixing.

Winter fogs are usually of a radiation type, forming in the early morning near sunrise, in the calm or light southeast flow of a high which has just moved east of Offutt. These fogs, being local in extent or confined to the river areas, normally last only a few hours after sunrise. Less frequent, but more widespread and persistent fogs, develop when a stationary north-south oriented front to the west traps saturated southerly flow. After initial cooling and formation, the heavy fog and stratus may last for a week or more and usually requires the front to pass to the east of the station to relieve the situation.



Mean Winter Cyclone tracks affecting the Offutt area (after Bowie and Heightman)

Cyclones in Case 1 normally develop under an upper level short wave moving along the stationary Arctic front in the lee of the Rockies.

Cyclogenesis in Case 2 usually occurs under a strong eastward moving trough.

Figure 1

117-4-3

NOT REPRODUCIBLE

## SECTION B SPRING

In this transition period, the mean position of the polar front begins to move northward yielding more frequently to the tropical Gulf air. As the season progresses, maritime polar air begins to cross the Rockies, replacing the drier continental air. Cyclonic storms are still significant with flying weather improving steadily. Early spring's visibilities and ceilings are as poor as winter values decreasing to 6 $\frac{1}{2}$  and 4 $\frac{1}{2}$  below 1000 & 2 for April and May respectively.

As warmer Gulf air becomes available, rain and freezing precipitation increase and are often mixed with snow. The warmer air also lowers stability values and thunderstorms increase from one day in March to four in April and eight in May. These storms, which may be frontal or over-running, contribute to higher precipitation totals for spring and summer.

Fog is not widespread during this season although it may form in moist air that has had restricted heating the day before. Clear skies and light gradients aid this fog situation and are not uncommon. A low stratus may form in light southerly flow where cooling is not sufficient and winds are too strong for fog.

### SECTION C SUMMER

The summer months are dominated by maritime tropical air from the Gulf of Mexico. This air is displaced two or three times a month by maritime polar air which has moved across the Rockies and then eastward behind a weak cold front. At irregular intervals, continental polar air pushes south into the area, but as a rule, quickly retreats northward.

The only prolonged periods of IFR weather occur with lows which form to the southwest along an east-west stationary polar front. As the low moves into the Oklahoma, Kansas area, low stratus ceilings, reduced visibilities in pre-warm frontal fog, and light continuous precipitation will persist as the low moves from the panhandle to eastern Missouri.

Thunderstorms, reaching a peak frequency of ten days per month in June, bring perhaps the most hazardous weather of any season. Almost all thunderstorms are frontal with air mass storms being rare. Thunderstorms caused by over-running usually display little organization and often develop over large areas in less than an hour, lasting for periods of six hours or more. In contrast, cold frontal or squall line storms can usually be tracked by radar at a distance as they develop to the west. They normally move through the Offutt vicinity in one or two hours. These storms tend to intensify just east of Offutt where moisture values increase in the southerly flow from the Gulf.

III-C-1

NOT REPRODUCIBLE

## SECTION D FALL

Summer synoptic patterns continue over Nebraska during September and the early part of October with maritime tropical air masses receding slowly southward. During October, relatively dry and stable maritime polar highs move into Nebraska following weak troughs with excellent flying weather continuing for several days. The first significant incursions of continental polar air occur in November with frontal structures becoming more defined and assuming more regularity of movement.

The main cause of unfavorable flying weather in the fall is low pressure systems passing to the south of the station. Occurrences of rain are most prevalent with rain changing to snow or rain and snow mixed becoming predominant during the latter part of the season.

Another cause of poor flying weather is radiation fog, becoming more frequent in October and November. A typical case of radiation fog occurs as the return circulation around a high brings light southeast winds up the Missouri River valley. Another case is a weakening maritime front moving in from the northwest with a substantial rain pattern and either riding aloft over Offutt or washing out in the local area. Both situations are preceded by restrictive daylight heating, increasing dew points, and very light winds after sunset. Precipitation may or may not precede the fog formation, but clearing at sunset is normal before fog formation.

III-D-1

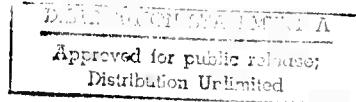
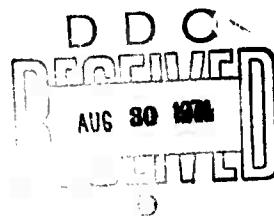
NOT REPRODUCIBLE

TERMINAL FORECAST REFERENCE FILE

PART IV

LOCAL AREA AND TERMINAL FORECAST STUDIES

	PAGE
SECTION A      FORECAST STUDIES	IV-A-1



AN OBJECTIVE TECHNIQUE FOR  
PREDICTING PRECIPITATION TYPE  
AT OFFUTT AIR FORCE BASE

by

DAVID L. NELSON, Capt, USAF



JULY 1971

BASE WEATHER DIVISION

OFFUTT AFB, NEBRASKA

## I. Acknowledgement

The author wishes to gratefully acknowledge Lt Col Dale Rogers, Chief, Climatology Branch, Aerospace Sciences Division, 3d Weather Wing, for his continual support and encouragement in this project. He performed all of the data processing; providing the author with the completed product. Without his suggestions and programming support, this paper would not have been possible.

## II. General

The forecasting of precipitation type at Offutt Air Force Base has been a long standing problem. Several forecast aids have been provided by scientific services personnel which relate probability of frozen/liquid forms of precipitation to various thickness/temperature values from soundings or prog charts. The two used previously at this station were Hilworth (1) and Wagner (2). Both studies were prepared for precipitation type over a large geographical area and not specifically designed for this airfield. The acquisition of a RAOB history tape for Omaha, Nebraska offered a unique opportunity to make a detailed analysis on various parameters from a local sounding and relate these values to precipitation type at Offutt.

## III. Data

Two data sources were necessary to relate upper air and surface parameters. The RAOB tape for Omaha, Nebraska was used for upper level thicknesses and temperatures and the surface data tape for Offutt AFB was used for determining precipitation type and surface temperature at RAOB release time. The Omaha RAOB station is seventeen miles north of the airfield and is considered representative of the air mass affecting Offutt. The period of record used was October to April only from 1957 through 1967.

## IV. Procedures

The approach taken in this study was the "perfect forecast" assumption. Precipitation type near the sounding time was related to RAOB parameters. Specifically, 00Z and 12Z soundings were available and surface observations within three hours of the RAOB time were used to categorize precipitation type. The types considered were: hail, snow, sleet, freezing precipitation, rain, rain and snow mixed, and snow showers. Rain and snow mixed was also counted as a rain occurrence and a snow occurrence, and snow showers were also counted as a snow occurrence.

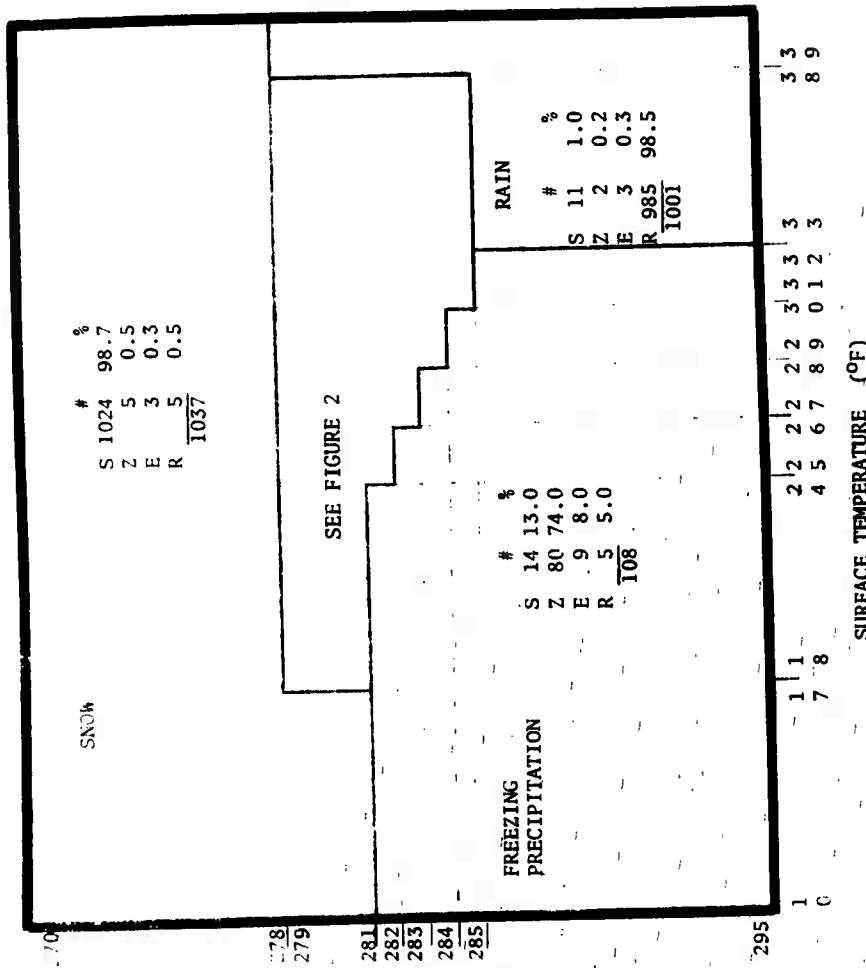
Several schemes were tried relating various parameters in order to get the best discrimination in the data. Surface temperature and the 950MB temperature were both related to five thickness values (1000-500, 1000-700, 1000-850, 850-500, and 850-700MBs). Two other schemes were attempted relating 1000-850MB thickness to the 850-700MB thickness and the 900MB temperature versus the 850-950MB temperature difference. Each scatter diagram was analyzed for data discrimination with the goal being to isolate the most cases with 98 percent reliability.

## V. Results

The scatter diagram which produced the best shred was the 1000-700MB thickness versus surface temperature. To repeat, the best shred was defined to mean the scatter diagram which isolated the most number of cases with 98 percent reliability. The results are shown in figure 1. Raw data figures are provided for information to assist the user in making value judgments on the reliability of each area. Due to the relatively small number of freezing precipitation occurrences, 98 percent reliability was not possible in this area. However, due to the operational significance of this area, the area was delineated such that it included the most occurrences of freezing precipitation possible without diluting the reliability. This area forecasts 50 percent of all freezing precipitation occurrences with 74 percent reliability. Again, the raw data figures will assist the user.

The investigator was now faced with the central area where data types overlapped and no one type of precipitation was clearly dominant. The data points which fell in this area were processed by all the remaining schemes which were used for the original data with few encouraging results. So few data points were isolated by any one scheme that further study was discontinued. Based on several years experience as a Chief Forecaster, it was also determined that the scheme would get more utilization if it was kept simple and easy to use. The overlap area was then analyzed by a most probable or best forecast scheme with the results shown in figure 2. As shown, a rain and snow mixed area was delineated as a "best forecast". This phenomena did not dominate the area, but 80 percent of the occurrences of rain and snow mixed did fall in this area and there is almost equal probability of rain or snow. As a reminder, the 50 cases of mixed are included as a rain and a snow occurrence such that realistic numbers are: snow 73, rain 112, and mixed 50. The forecast of mixed will then verify about 20 percent of the time, but in this investigator's opinion, it is the "most reasonable" forecast.

PRECIPITATION TYPE AS A FUNCTION OF  
1000-700MB THICKNESS AND SURFACE  
TEMPERATURE



1000-700MB THICKNESS (DECAMETERS)

FIGURE 1

IV-A-4

PRECIPITATION TYPE AS A FUNCTION OF 1000-700MB THICKNESS AND SURFACE TEMPERATURE

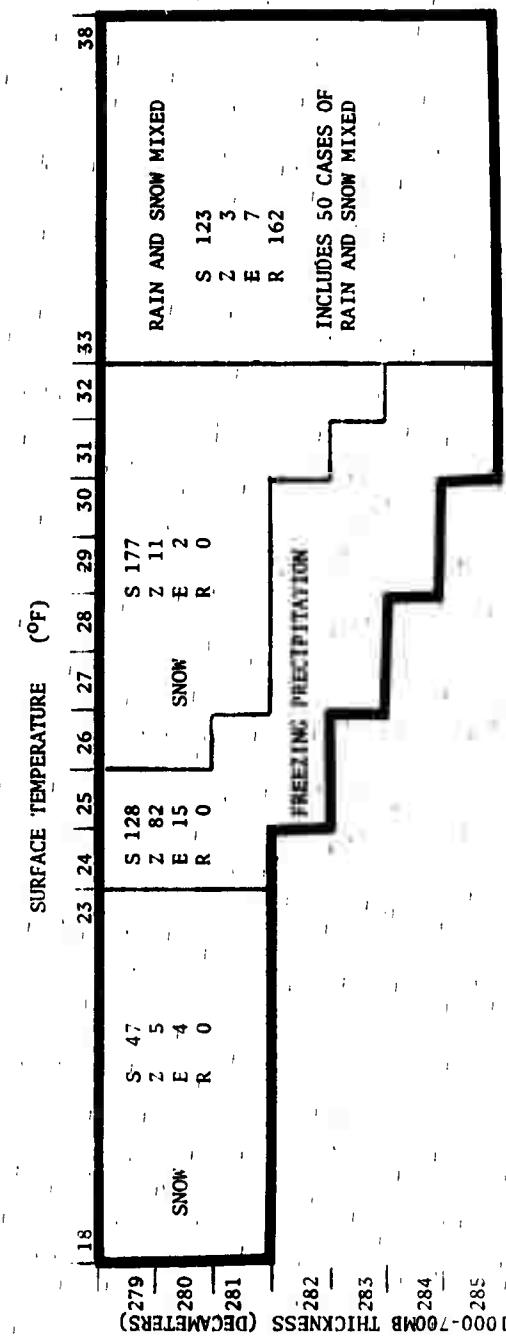


FIGURE 2  
IV-A-5

The remaining area was delineated by a "best forecast" technique. Care must be taken in this area because of the high frequency of occurrence of all phenomena. Raw data figures are provided to assist the user. Since the entire area is at or below freezing on the surface, occurrences of rain were included as freezing precipitation. Freezing precipitation versus rain will then be a function of temperature trend (i.e. is the temperature going above or below freezing with time?). This judgment can be made at the time of the forecast. One will notice that the "best forecast" is not the "most probable" in the case of freezing precipitation. Freezing precipitation, however, has a much greater operational significance than snow, and even though this is a technical paper, it is to be an "operational forecast aid". The two freezing precipitation areas (figures 1 and 2) forecast 85 percent of all occurrences of this hazardous phenomenon and is considered justified because the forecaster will be correct almost 50 percent of the time. In the case of freezing precipitation, a high prefigurance was deemed more important than post agreement.

## VI Statistics

Using figures 1 and 2, the following table can be constructed using the dependent data in the study:

		FORECAST					
		S	Z	E	R	M	T
OBSERVED	S	1245	142	0	5	73	1465
	Z	21	162	0	2	3	188
	E	9	24	0	3	7	43
	R	2	5	0	979	112	1098
	M	3	0	0	6	50	59
		T	1280	333	0	995	245 2853

NOTE: For the above table, rain/snow mixed was deleted from rain and snow occurrences such that data are not reflected twice.

As can be seen, this table produces an 85 percent correct forecast using the proposed scheme. The Skill Score which results is 0.77 explaining 59 percent of the variance. It must be remembered, however, that a high Skill Score was not the only goal as was explained in the freezing precipitation and rain/snow mixed areas in figure 2. The goal was also to predict hazardous weather and make the most reasonable operational forecast.

## VII Verification

This study was tested on an independent data sample from October 1968 through April 1969. The frequency of occurrence of precipitation types was similar to the dependent data sample and the results should then be representative. The test rules were exactly the same as were for the original study. The following table depicts the results:

		FORECAST						
		S	Z	E	R	M	T	
OBSERVED	S	133	21	0	2	20	176	
	Z	2	33	0	0	0	35	
	E	1	4	0	1	1	7	
	R	2	1	0	136	24	163	
	M	2	0	0	1	6	9	
		T	140	59	0	140	53	392

$$\text{Percent Correct} = 308/392 = 78.6$$

$$\text{Skill Score} = (308-128)/(392-128) = 0.68$$

These results may appear disappointing and they tempted this investigator to search for a "better" independent sample. There are, however, some encouraging facts in the table. First, the verification was lowered for two reasons: the relatively high occurrence of snow in the forecast freezing precipitation column and the high occurrence of rain or snow in the rain/snow mixed column. The first cause can be easily rationalized by noting that this study may overforecast freezing precipitation but it did forecast 94 percent of all freezing precipitation occurrences. If you'll recall, that was my intention. The second cause can also be rationalized; 67 percent of the mixed occurrences were correctly forecast and the frequency of occurrence of pure rain or pure snow is almost equal. The second interesting feature is the accuracy of pure rain/pure snow forecasts. A forecast of rain verified 97 percent and a forecast of snow verified 95 percent.

## VIII Conclusion

The high percent of freezing precipitation observations which were correctly forecast and the high rain/snow forecast verification rate makes this study informative and useful. It should be incorporated into the forecast routine for the determination of forecast precipitation type.

## IX References

- (1) Schafer, R.J., et al: "Further Studies in the Development of Short Range Weather Prediction Techniques", Scientific Report No. 1, Eastern Air Lines, Inc., Contract No. AF19(604)-2073, April 1958, pp.158-169.

(2) Wagner, A. James: "Mean Temperature from 1000MB to 500MB as a Predictor of Precipitation Type", AFCRC-TN-57-288, May 1957.